320130 - CI - Air Conditioning Systems and Instrumentation

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 724 - MMT - Department of Heat Engines
729 - MF - Department of Fluid Mechanics

Academic year: 2018
Degree: BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
ECTS credits: 6
Teaching languages: Catalan, Spanish

Teaching staff

Coordinator: Òscar Ribé
Gustavo Adolfo Raush Alviach

Others: Gustavo Adolfo Raush Alviach
Robert Castilla
Viktorov Danov Stoyan
Óscar Ribé

Prior skills

Students might have passed the subjects of Thermal Engineering and Thermal Systems.

Degree competences to which the subject contributes

Transversal:
1. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.
2. TEAMWORK - Level 2. Contributing to the consolidation of a team by planning targets and working efficiently to favor communication, task assignment and cohesion.

Teaching methodology

- Theoretical sessions and resolution of exercises.
- Work in group
- Independent work and study exercises.

The problem-based sessions introduce the theoretical foundations of the subject, concepts, methods and results through solved exercises.
The sessions of practical work in the classroom (problems) will include problem solving and application development HVAC project in a group with their final oral presentation.

Learning objectives of the subject

Learn and apply the basic theoretical concepts of environmental comfort in order to achieve the ability to calculate design, analyze and work with equipment and air conditioning systems.
Develop specific skills.
### Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 30h</th>
<th>20.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 0h</td>
<td>0.00%</td>
</tr>
<tr>
<td></td>
<td>Hours small group: 30h</td>
<td>20.00%</td>
</tr>
<tr>
<td></td>
<td>Guided activities: 0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Self study: 90h</td>
<td>60.00%</td>
</tr>
</tbody>
</table>
# Content

## TOPIC 1: Introduction to HVAC

**Learning time:** 30h

<table>
<thead>
<tr>
<th>Theory classes: 8h</th>
<th>Practical classes: 8h</th>
<th>Self study: 14h</th>
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</thead>
</table>

### Description:
- The concept of comfort
- Comfort, energy and sustainability
- The production of heat and cold

## TOPIC 2: Descriptive elements and facilities

**Learning time:** 30h

<table>
<thead>
<tr>
<th>Theory classes: 8h</th>
<th>Practical classes: 8h</th>
<th>Self study: 14h</th>
</tr>
</thead>
</table>

### Description:
2.1. Basic description of the machine and its accessories
2.2. Operations with the splitter plate
2.3. Calculation of straight and helical gears

## TOPIC 3: Characteristic parameters of the thermal envelope

**Learning time:** 30h

<table>
<thead>
<tr>
<th>Theory classes: 8h</th>
<th>Laboratory classes: 8h</th>
<th>Self study: 14h</th>
</tr>
</thead>
</table>

### Description:
- Thermal transmittance
- Solutions taken in isolation
- HE-1 Basic Requirement
TOPIC 4: Calculation of thermal loads

Learning time: 60h
- Theory classes: 6h
- Practical classes: 6h
- Self study: 48h

Description:
- Climate and weather databases
- Thermal winter load
- Summer heat load
- Thermal load due to internal generation. Latent heat

Qualification system
- Group delivering activities (lab) - 30%
- Group delivering activities (application) - 30%
- Mid-term exam - 20%
- Final exam - 20%

Bibliography
Basic: