220111 - Heat Technology

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 724 - MMT - Department of Heat Engines
Academic year: 2019
Degree: BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Catalan, Spanish

Teaching staff
Coordinator: Castro Gonzalez, Jesus
Others: Carles David Pérez Segarra
Oliva Llena, Asensio

Opening hours
Timetable: The specific timetable is agreed on with the students according to their availability

Prior skills
Basic knowledge of previous courses: mathematics (specially differential and integral calculus), physics, mechanics of continuous media, fluid mechanics, thermodynamics.

Degree competences to which the subject contributes
Specific:
1. Applied knowledge of thermal engineering

Teaching methodology


Learning objectives of the subject
Basic formation, in first level, in heat transfer by conduction, convection and radiation: phenomenological aspects, mathematical formulation (basic laws of conservation and constitutive laws) and analytical and numerical solution techniques.
Introduction of technology application issues in order to strengthen basic education and give some initial basis for calculation and design of thermal systems and equipment in order to increase their energy efficiency and reduce environmental impact. Examples are presented related to the fields of heat exchangers, solar, thermal load balance in rooms and buildings, cooling electrical and electronic components.
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Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 46h</th>
<th>30.67%</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Hours small group: 14h</td>
<td>9.33%</td>
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<td>Guided activities: 0h</td>
<td>0.00%</td>
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<tr>
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<td>Self study: 90h</td>
<td>60.00%</td>
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Content

Module 1. Introduction heat transfer by conduction

Learning time: 40h
- Theory classes: 18h
- Laboratory classes: 2h
- Self study: 20h

Module 2. Heat transfer by convection

Learning time: 38h
- Theory classes: 16h
- Laboratory classes: 2h
- Self study: 20h

Module 3. Heat transfer by radiation

Learning time: 22h
- Theory classes: 8h
- Laboratory classes: 2h
- Self study: 12h

Module 4. Combined Problems

Learning time: 50h
- Practical classes: 4h
- Laboratory classes: 8h
- Self study: 38h
Planning of activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory lessons</td>
<td>60h</td>
</tr>
<tr>
<td>Problem lessons</td>
<td>63h</td>
</tr>
<tr>
<td>Project of the course</td>
<td>20h</td>
</tr>
<tr>
<td>First mid-term exam</td>
<td>2h</td>
</tr>
<tr>
<td>Second mid-term exam</td>
<td>2h</td>
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<tr>
<td>Exam final</td>
<td>3h</td>
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Qualification system

First mid-term exam accounts for 40% of the final mark.
Control tests account for 10% of the final mark.
Final exam accounts for 50% of the final mark.

There is the possibility of increasing the final mark of the exams by presenting and defending optional numerical simulation projects developed during the course and under the guidance of the lecturers. In that case, a minimum final mark of 4.5 is required.

The result of the first mid-term exam could be recovered/improved in the final exam. The mark obtained due to the recovering process will replace the initial mark if, and only if, this mark is higher that the initial mark.
Regulations for carrying out activities

The exams will consist of theory and problems. It is not allowed to use any extra material, except the one delivered by the lecturers. The use of mobile phones, smartwatches or similar devices, together with computers and programmable calculators, is also not allowed.

Bibliography

Basic:


Complementary:


Others resources:

Audiovisual material

Apunts realitzats pel professorat de l’assignatura