220128 - Energy Efficiency Systems

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 758 - EPC - Department of Project and Construction Engineering
Academic year: 2019
Degree: BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN TEXTILE TECHNOLOGY AND DESIGN ENGINEERING (Syllabus 2009).
(Teaching unit Optional)
BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING
(Syllabus 2010). (Teaching unit Optional)
BACHELOR'S DEGREE IN AEROSPACE TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Optional)
BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Optional)
BACHELOR'S DEGREE IN AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Teaching unit Optional)
ECTS credits: 3
Teaching languages: English

Teaching staff
Coordinator: Joan Carles Fernández Vallés

Teaching methodology
The course is divided into parts:
Theory classes
Practical classes
Self-study for doing exercises and activities.
In the theory classes, teachers will introduce the theoretical basis of the concepts, methods and results and illustrate them with examples appropriate to facilitate their understanding.
In the practical classes (in the classroom), teachers guide students in applying theoretical concepts to solve problems, always using critical reasoning. We propose that students solve exercises in and outside the classroom, to promote contact and use the basic tools needed to solve problems.
Students, independently, need to work on the materials provided by teachers and the outcomes of the sessions of exercises/problems, in order to fix and assimilate the concepts.
The teachers provide the syllabus and monitoring of activities (by ATENEA).

Learning objectives of the subject
To introduce the student into a new way to analyze different systems taking into consideration the energetic point of view. Public buildings, transport and industries examples will be analyzed in order to reach improvements in their energetic costs.
## Study load

<table>
<thead>
<tr>
<th>Total learning time: 75h</th>
<th>Hours large group:</th>
<th>30h</th>
<th>40.00%</th>
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<tbody>
<tr>
<td></td>
<td>Self study:</td>
<td>45h</td>
<td>60.00%</td>
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## Content

### Module 1: Energy Audits

**Description:**
1. Definitions
2. Basic Energy concepts
3. Units
4. Introduction to the bills comprehension
5. Energy audits (Steps, scope)

**Learning time:** 14h  
Theory classes: 6h  
Self study: 8h

### Module 2: Building Energy Audit

**Description:**
1. Introduction
2. Building concepts
3. Lighting concepts
4. Heating and cooling
5. First exercise definition

**Learning time:** 14h  
Theory classes: 6h  
Self study: 8h

### Module 3: Energetic improvements in Transport.

**Description:**
1. First exercise presentation
2. Introduction to the energetic consumption in the transport
3. Aeronautics energetic improvements
4. Railway energetic improvements
5. Automotive energetic improvements

**Learning time:** 14h  
Theory classes: 6h  
Self study: 8h
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## Module 4: Industrial energetic assessment

<table>
<thead>
<tr>
<th>Description:</th>
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<tbody>
<tr>
<td>1. Introduction</td>
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<tr>
<td>2. Electrical energy management</td>
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<tr>
<td>3. Energetic improvements in the industry</td>
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<tr>
<td>4. Second exercise definition</td>
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<table>
<thead>
<tr>
<th>Learning time:</th>
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<tr>
<td>14h</td>
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- Theory classes: 6h
- Self study: 8h

## Module 5: Second exercise presentation

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<th>Description:</th>
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<tbody>
<tr>
<td>1. Presentations</td>
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<table>
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<tr>
<th>Learning time:</th>
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<tbody>
<tr>
<td>19h</td>
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- Theory classes: 6h
- Self study: 13h

## Qualification system

The final grade will be calculated based on:

\[
NT = 0.4 \times N1 + 0.5 \times N2 + 0.1 \times NC
\]

<table>
<thead>
<tr>
<th>Being:</th>
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<tbody>
<tr>
<td>NT: Final Grade</td>
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<tr>
<td>N1: First Exercise qualification</td>
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<tr>
<td>N2: Second Exercise qualification</td>
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<tr>
<td>NC: Contribution to the meetings</td>
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## Bibliography

### Basic:


### Complementary:


### Others resources:

- Class notes