Course guide
330536 - HS - Habitability and Security

Unit in charge: Manresa School of Engineering
Teaching unit: 750 - EMIT - Department of Mining, Industrial and ICT Engineering.
717 - DEGD - Department of Engineering Graphics and Design.

Degree: BACHELOR'S DEGREE IN AUTOMOTIVE ENGINEERING (Syllabus 2017). (Compulsory subject).

Academic year: 2022  ECTS Credits: 3.0  Languages: Catalan, Spanish, English

LECTURER

Coordinating lecturer: Lopez Martinez, Joan Antoni
Felipe Blanch, Jose Juan De

Others: Niubo Eslava, Maria
Felipe Blanch, Jose Juan De

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CE14. Knowledge of and a capacity for project organisation and management. Knowledge of the organisational structures and the functions of the automobile industry.

Generical:
CG4. Ability to solve problems with initiative, decision-making, creativity, critical reasoning and to communicate and transmit knowledge, skills and skills in the field of automotive engineering.
CG10. The ability to work in a multilingual and multidisciplinary environment.
CG11. Ability to write and develop projects for vehicles and/or their components.

Transversal:
1. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.
2. TEAMWORK - Level 3. Managing and making work groups effective. Resolving possible conflicts, valuing working with others, assessing the effectiveness of a team and presenting the final results.
3. EFFECTIVE USE OF INFORMATION RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.
4. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.
5. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.
02 SCS N3. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 3. Taking social, economic and environmental factors into account in the application of solutions. Undertaking projects that tie in with human development and sustainability.

Basic:
CB2. Students will be able to apply their knowledge to their work or vocation in a professional manner and demonstrate that they possess the competencies that are typically demonstrated by elaborating and defending arguments and solving problems in the field of study.
CB3. That students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include a reflection on relevant social, scientific or ethical issues.
CB4. Students can transmit information, ideas, problems and solutions to a specialized and non-specialized audience.
TEACHING METHODOLOGY

MD1 Master class or conference (EXP)
MD2 Problem solving and case study (RP)
MD3 Workshop or practical work (TP)
MD5 Projects, activities or works of reduced scope (PR)
MD7 Broad scope project or work (PA)

LEARNING OBJECTIVES OF THE SUBJECT

The course aims to provide basic knowledge about the habitability and safety of vehicles.

The different learning objectives include:
- Know the habitability of a vehicle.
- Know the different safety technologies in vehicles.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours small group</td>
<td>15,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>15,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Self study</td>
<td>45,0</td>
<td>60.00</td>
</tr>
</tbody>
</table>

Total learning time: 75 h

CONTENTS

Title of content 1: Concept of ergonomics. Ergonomics applied to a vehicle.

Description:
Introduction to the concept of ergonomics. Application to the space limitations of a vehicle. Essential dimensions.

Specific objectives:
Understanding the concept of ergonomics. Application of ergonomics in a vehicle. Minimum interior dimensions.

Related activities:
Specific work on the contents (Activity 1)

Full-or-part-time: 10h
- Theory classes: 2h
- Laboratory classes: 2h
- Self study: 6h
### Content Title 2: Vehicle Habitability

**Description:**
Concept of habitability of a vehicle.

**Specific objectives:**
Understanding and analysis of the concept of habitability of a vehicle.

**Related activities:**
Specific work on the contents (Activity 2)

<table>
<thead>
<tr>
<th>Full-or-part-time:</th>
<th>5h</th>
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</thead>
<tbody>
<tr>
<td>Theory classes:</td>
<td>1h</td>
</tr>
<tr>
<td>Laboratory classes:</td>
<td>1h</td>
</tr>
<tr>
<td>Self study:</td>
<td>3h</td>
</tr>
</tbody>
</table>

### Content title 3: Machine-human interface (HMI)

**Description:**
Evolution and current status of the HMI

**Specific objectives:**
Understanding of the different relationships between the machine and the human being.

**Related activities:**
Specific work on the contents (Activity 3)

<table>
<thead>
<tr>
<th>Full-or-part-time:</th>
<th>20h</th>
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</thead>
<tbody>
<tr>
<td>Theory classes:</td>
<td>4h</td>
</tr>
<tr>
<td>Laboratory classes:</td>
<td>4h</td>
</tr>
<tr>
<td>Self study:</td>
<td>12h</td>
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### Content title 4: Thermal and acoustic comfort

**Description:**

**Specific objectives:**
Understanding, analysis and application of the theory of comfort and acoustics.

**Related activities:**
Specific work on the contents (Activity 1)

<table>
<thead>
<tr>
<th>Full-or-part-time:</th>
<th>10h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes:</td>
<td>2h</td>
</tr>
<tr>
<td>Laboratory classes:</td>
<td>2h</td>
</tr>
<tr>
<td>Self study:</td>
<td>6h</td>
</tr>
</tbody>
</table>
### Content Title 5: Passive Safety

**Description:**
Passive safety systems in a vehicle. Trends in its design.

**Specific objectives:**
Understanding of the passive safety systems of a vehicle.

**Related activities:**
Specific work on the contents (Activity 2)

**Full-or-part-time:** 15h
- Theory classes: 3h
- Laboratory classes: 3h
- Self study: 9h

### Content Title 6: Active Safety

**Description:**
Active safety systems of a vehicle. Design trends.

**Specific objectives:**
Understanding of the active safety systems of a vehicle.

**Related activities:**
Specific work on the contents (Activity 3)
- Final presentation (Activity 4)
- Individual test (Activity 5)

**Full-or-part-time:** 15h
- Theory classes: 3h
- Laboratory classes: 3h
- Self study: 9h
**ACTIVITIES**

### Title of activity 1: Ergonomics in the vehicle and comfort

**Description:**
Carry out a work on ergonomics and comfort applied to the vehicle of those proposed by the teacher. The public presentation must be made (Evaluation of the transversal competence "Teamwork level 3")

**Specific objectives:**
- Development of reasoning techniques and strategies for analysis
- Written and oral communication
- Teamwork
- Third language
- Solvent use of information resources
- Social commitment and sustainability
- Innovation

**Material:**
In the digital campus "ATENEA"

**Delivery:**
10% of the grade

**Full-or-part-time:** 16h
- Theory classes: 1h
- Self study: 15h

### Activity title 2: Habitability of a vehicle and passive safety

**Description:**
Carry out a work on the subject. Proposed by the teacher. It must be made public.

**Specific objectives:**
- Development of reasoning techniques and strategies for analysis
- Written and oral communication
- Teamwork
- Third language
- Solvent use of information resources
- Social commitment and sustainability
- Innovation

**Material:**
In the digital campus "ATENEA"

**Delivery:**
15% of the grade

**Full-or-part-time:** 16h
- Theory classes: 1h
- Self study: 15h
Activity title 3: HMI and active safety

Description: Carry out a work on the subject. Proposed by the teacher. It must be made public.

Specific objectives:
Development of reasoning techniques and strategies for analysis
Written and oral communication
Teamwork
Third language
Solvent use of information resources
Social commitment and sustainability
Innovation

Material:
In the digital campus "ATENEA"

Delivery:
20% of the grade

Full-or-part-time: 16h
Theory classes: 1h
Self study: 15h

Activity title 4: Final presentation

Description: Perform a previously designed vehicle job. It must be made public.

Specific objectives:
Development of reasoning techniques and strategies for analysis
Written and oral communication
Teamwork
Third language
Solvent use of information resources
Social commitment and sustainability
Innovation

Material:
In the digital campus "ATENEA"

Delivery:
30% of the grade

Full-or-part-time: 16h
Theory classes: 1h
Self study: 15h
**Title of activity 5: Individual test**

**Description:**
Take a test on the theoretical contents of the course. It is individual.

**Specific objectives:**
- Development of reasoning techniques and strategies for analysis
- Third language
- Social commitment and sustainability
- Innovation

**Material:**
In the digital campus "ATENEA"

**Delivery:**
- 25% of the grade

**Full-or-part-time:**
- 16h
  - Theory classes: 1h
  - Self study: 15h

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**GRADING SYSTEM**

Activity 1: 10% mark  
Activity 2: 15% mark  
Activity 3: 20% mark  
Activity 4: 30% grade  
Activity 5: 25% mark  
Class attendance and participation: 0% grade

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**BIBLIOGRAPHY**

**Basic:**

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**RESOURCES**

**Other resources:**
In the digital campus "ATENEA"