



## Course guide

# 330536 - HS - Habitability and Security

Last modified: 04/05/2023

**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:** 2023    **ECTS Credits:** 3.0    **Languages:** Catalan, Spanish, English

### LECTURER

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**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

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#### Specific:

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

CE19. Knowledge of occupancy, comfort and safety of vehicles.

#### 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.

08 GEN. GENDER PERSPECTIVE: An awareness and understanding of sexual and gender inequalities in society in relation to the field of the degree, and the incorporation of different needs and preferences due to sex and gender when designing solutions and solving problems.

#### 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

Type	Hours	Percentage
Hours small group	15,0	20.00
Hours large group	15,0	20.00
Self study	45,0	60.00

**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)

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

Theory classes: 1h

Laboratory classes: 1h

Self study : 3h

## 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)

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

Theory classes: 4h

Laboratory classes: 4h

Self study : 12h

## Content title 4: Thermal and acoustic comfort

**Description:**

Theory of thermal comfort. Limits of temperature, humidity and air speed. Acoustic principles. Acoustic comfort zone. Thermal and acoustic insulators.

**Specific objectives:**

Understanding, analysis and application of the theory of comfort and acoustics.

**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 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

## GRADING SYSTEM

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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

## BIBLIOGRAPHY

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**Basic:**

- Font Mezquita, José; Dols Ruiz, Juan F. Tratado sobre automóviles. Tomo I. Valencia: Universidad Politécnica de Valencia, 2004. ISBN 9788477215011.

- Bhise, Vivek D. Ergonomics in the automotive design process [on line]. Boca Raton [etc.]: CRC Press, cop. 2012 [Consultation: 10/06/2022]. Available on:

<https://www.taylorfrancis-com.recursos.biblioteca.upc.edu/books/mono/10.1201/b11237/ergonomics-automotive-design-process-vivek-bhise>. ISBN 9781439842102.

## RESOURCES

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**Other resources:**

In the digital campus "ATENEA"