

## Course guide

### 240AU212 - 240AU212 - Introduction to Competition Vehicles

**Last modified:** 16/05/2023

**Unit in charge:** Barcelona School of Industrial Engineering  
**Teaching unit:** 712 - EM - Department of Mechanical Engineering.

**Degree:** MASTER'S DEGREE IN AUTOMOTIVE ENGINEERING (Syllabus 2012). (Optional subject).  
MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2014). (Optional subject).  
MASTER'S DEGREE IN AUTOMOTIVE ENGINEERING (Syllabus 2019). (Optional subject).

**Academic year:** 2023    **ECTS Credits:** 3.0    **Languages:** Spanish

#### LECTURER

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**Coordinating lecturer:** ARNAU DORIA CEREZO

**Others:** Conferenciants: Vicens Aguilera

#### PRIOR SKILLS

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Knowledge in vehicle dynamics

#### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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**Specific:**

1. Apply knowledge of mathematics, physics and technology obtained through study, experience and practice, using critical reasoning to establish economically viable solutions to technical problems in the automotive sector
2. Conceptualize engineering models, apply innovative methods in problem solving and applications suitable for the design, simulation, optimization and control of processes and systems
3. Perform, present and defend an original exercise performed individually before a university tribunal, consisting of a comprehensive project of Automotive Engineering professional nature which synthesizes the skills acquired in the teachings

**General:**

4. Ability to apply appropriate knowledge of mathematical aspects, analytical, scientific, instrumental, technological and management, the resolution of the problems of the automotive

#### TEACHING METHODOLOGY

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Lectures  
Autonomous learning  
Cooperative learning

#### LEARNING OBJECTIVES OF THE SUBJECT

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Achieve that the students acquire a general knowledge of the development process and design of a competition vehicle. With this knowledge, the development of specific solutions can be dealt with a global vision of the generic performance of a vehicle and the specific conditions of a competition

## STUDY LOAD

Type	Hours	Percentage
Hours medium group	27,0	36.00
Self study	48,0	64.00

**Total learning time:** 75 h

## CONTENTS

### Concept and architecture

**Description:**

Definition of the best architecture of a competition vehicle to adapt it to the technical and sport regulation of a specific test. Security requirements. Aerodynamic concepts and its weighting

**Specific objectives:**

Knowledge in the architecture of a competition vehicle.

**Full-or-part-time:** 30h

Theory classes: 10h

Self study : 20h

### Engines, transmissions and suspensions

**Description:**

Definition of the mechanical parts. Definition and concept of suspension, direction and brakes for competitions. Engines and transmissions.

**Specific objectives:**

Achieve knowledge in the suspension directions and brakes in the competition vehicles.

**Full-or-part-time:** 18h

Theory classes: 10h

Practical classes: 8h

### Development of the concept of a single-seater vehicle

**Description:**

Basic requirements for the development of a single-seater vehicle with specific objectives of cost and performance.

**Specific objectives:**

Achieve knowledge of the basic requirements for the development of a single-seater vehicle

**Full-or-part-time:** 9h

Practical classes: 4h

Self study : 5h

### Electricity and electronics

**Description:**

Definition of the basic electrical components, electronical components and hybrid systems. The KERS

**Specific objectives:**

Knowledge of the basic electrical components

**Full-or-part-time:** 9h

Theory classes: 3h

Self study : 6h

### Organization of races

**Description:**

Description of the different roles of the engineer, organization of the testing team, data gathering and development of a race.

**Specific objectives:**

Knowledge of the role of an engineer in the races

**Full-or-part-time:** 9h

Theory classes: 5h

Self study : 4h

## ACTIVITIES

### INTERACTIVE CLASSES

**Description:**

Exposition by the Professor of the contents indicated in the section "content", with an active participation of the students

**Material:**

Notes in class

**Full-or-part-time:** 40h

Theory classes: 26h

Self study: 14h

### RESOLUTION OF EXERCISES AND PRACTICAL EXAMPLES

**Description:**

Resolution of the exercises in class and at home

**Material:**

Notes and formulation

**Delivery:**

In class and according to the scheduled data

**Full-or-part-time:** 13h

Practical classes: 10h

Laboratory classes: 3h



### MONOGRAPHIC WORK

**Description:**

Work about a specific topic

**Material:**

Notes in class and bibliography which the student must search

**Delivery:**

By the end of the course on a scheduled data

**Full-or-part-time:** 15h

Self study: 15h

### EXAMS

**Description:**

Realization of the written tests

**Specific objectives:**

Value the learning of the student with exercises and theory questions

**Material:**

Formulation given by the Professor

**Delivery:**

The same day as the exam

**Full-or-part-time:** 7h

Theory classes: 4h

Self study: 3h

### GRADING SYSTEM

Written exams: 60%

Deliveries: 20%

Monographic work: 20%

### EXAMINATION RULES.

The exams will consist on a generic theory part and a practical part. No material is allowed in the theory part. The use of a formulary is allowed in the practical part.

The exercises will be delivered in a 15 days period from the day they are proposed.

For the realisation of the monographic work different topic options will be proposed by the Professors. It will be carried out in groups and a written report will have to be handed in (of no more than 25 pages and according to the regulations of the Mechanical Department). Finally, the work will consist on an oral exposition of 15 minutes.