Course guide
240AU212 - 240AU212 - Introduction to Competition Vehicles

Last modified: 16/04/2024

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

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

Academic year: 2024 **ECTS Credits:** 3.0 **Languages:** Spanish

LECTURER

Coordinating lecturer: ARNAU DORIA CEREZO

Others: Conferenciants: Vicens Aguilera

PRIOR SKILLS

Knowledge in vehicle dynamics

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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 synthesize the skills acquired in the teachings

Generical:
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

Lectures
Autonomous learning
Cooperative learning

LEARNING OBJECTIVES OF THE SUBJECT

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

STUDY LOAD

Type	Hours	Percentage
Hours large 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

Organitzation 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
Self study: 14h
Theory classes: 26h

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
Self study: 3h
Theory classes: 4h

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 thery 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.