

**COMILLAS**

UNIVERSIDAD PONTIFICIA

ICAI

ICADE

CIHS

GUÍA DOCENTE**2025 - 2026****FICHA TÉCNICA DE LA ASIGNATURA****Datos de la asignatura**

Nombre completo	Crashworthiness
Código	DIM-M2S-623
Impartido en	Máster Universitario en Ingeniería Industrial + Máster in Motorsport, Mobility and Safety [Primer Curso] Máster Universitario en Ingeniería Industrial + Máster in Motorsport, Mobility and Safety [Segundo Curso] Máster Universitario en Ingeniería Industrial + Máster in Motorsport, Mobility and Safety [Primer Curso] Máster Universitario en Ingeniería Industrial + Máster in Motorsport, Mobility and Safety [Segundo Curso] Master in Motorsport, Mobility and Safety [Primer Curso]
Nivel	Master
Cuatrimestre	Semestral
Créditos	3,0 ECTS
Carácter	Obligatoria
Departamento / Área	Departamento de Ingeniería Mecánica
Responsable	Francisco J. López Valdés

Datos del profesorado**Profesor**

Nombre	Juan Manuel Asensio Gil
Departamento / Área	Instituto de Investigación Tecnológica (IIT)
Correo electrónico	jasensio@comillas.edu

DATOS ESPECÍFICOS DE LA ASIGNATURA**Contextualización de la asignatura****Aportación al perfil profesional de la titulación**

This course will be an introduction to the crashworthiness analysis of motor vehicles, including those characteristics and features that influence the mechanical behavior of the car structures. In addition, the course will provide a summary of existing crashworthiness assessment programs in the regulatory framework (type approval) and in the consumer-testing sector, with special focus on the EuroNCAP program.

The course will also review the role of road infrastructure in safety, with special attention to concrete and metal barriers and their associated safety standards.

Prerrequisitos

Knowledge of basic courses of strength of materials, injury biomechanics and restraint systems. Previous knowledge of Ls-Dyna, Ls-Prepost and Oasys Primer is also required.



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Competencias - Objetivos

BLOQUES TEMÁTICOS Y CONTENIDOS

Contenidos – Bloques Temáticos

1. Introduction to crashworthiness.
2. Introduction to the use of the Finite Element Method (FEM) in the analysis of the crashworthiness of the vehicles
3. Type-approval test in Europe
4. Introduction to consumer-testing programs
5. The development of EuroNCAP
 1. The ratings explained
6. EuroNCAP Adult Occupant Protection
7. EuroNCAP Child Occupant Protection
8. EuroNCAP Safety Assist
9. EuroNCAP Vulnerable Road User protection
10. The role of roadside infrastructure

METODOLOGÍA DOCENTE

Aspectos metodológicos generales de la asignatura

Metodología Presencial: Actividades

Laboratory content (7h) for the Crashworthiness class will consist of four projects to be developed using Ls-Dyna, Ls-Prepost and Oasys Primer, as follows:

1. Vehicle frontal impact against a rigid wall at 56 km/h to analyze the behavior of the structural components of the chassis

EVALUACIÓN Y CRITERIOS DE CALIFICACIÓN

Standard evaluation at the end of the term:

- Crashworthiness project (55%)
- Test about regulatory and consumer testing programs (35%)
- Quiz about road infrastructure (10%)
- Attendance: minimum 85% to be allowed to take the exam.

Additional evaluation during July (Retake):

- Crashworthiness project (55%)
- Test about regulatory and consumer testing programs (35%)
- Quiz about road infrastructure (10%)



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BIBLIOGRAFÍA Y RECURSOS

Bibliografía Básica

- *Ls-Dyna*. Manual Volume I and II.
- Handouts to be provided by instructors in class.