



Course guide

240658 - 240658 - Automotive Project

Last modified: 02/02/2024

Unit in charge: Barcelona School of Industrial Engineering
Teaching unit: 709 - DEE - Department of Electrical Engineering.

Degree: BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Optional subject).
BACHELOR'S DEGREE IN AUTOMOTIVE ENGINEERING (Syllabus 2017). (Optional subject).

Academic year: 2023 **ECTS Credits:** 4.5 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: DANIEL MONTESINOS MIRACLE

Others: Segon quadrimestre:
JOSE ANTONIO ANDRES MARTINEZ - Grup: 10

TEACHING METHODOLOGY

LEARNING OBJECTIVES OF THE SUBJECT

The objective of the subject is to introduce students to the world of electronic projects within the automotive sector, taking into account regulations, constructive aspects, and the design of electronic systems.

STUDY LOAD

Type	Hours	Percentage
Self study	45,0	50.00
Hours large group	45,0	50.00

Total learning time: 90 h

CONTENTS

Topic 1: Basic concepts of protection elements in automotive.

Description:

- Battery voltage.
- Transient overvoltages, Faraday - Lenz law.
- Switching with inductive loads, relays.
- Freewheeling diode.
- Specific integrated circuits for the switching of inductive loads. Darlington pair concept.

Full-or-part-time: 32h 30m

Theory classes: 6h

Guided activities: 7h

Self study : 19h 30m



Topic 2: Discrete protection elements in automotive.

Description:

- Reverse polarity protection, application example on the battery.
- TVS, transient voltage suppressor, definition, and applications.
- Varistors, definition, and applications.
- ICL, inrush current limiters, active and passive, application examples.
- SMART SWITCH, intelligent high-side power drivers with integrated mosfets.
- Automotive regulatory aspects UNECE R10 / CISPR 25, ISO 7637 pulses.

Full-or-part-time: 37h 30m

Theory classes: 7h

Guided activities: 8h

Self study : 22h 30m

Topic 3: Automotive Applications.

Description:

- Batteries, types, and applications.
- Intelligent charging managers (BMS).
- Battery chargers, charging methods.
- DC motor controllers, application examples (power windows, central locking, windshield wipers).
- Automotive communications, OSI layer model. CAN bus and LIN communication bus.

Full-or-part-time: 39h 30m

Theory classes: 8h

Guided activities: 9h

Self study : 22h 30m

GRADING SYSTEM
