

# EUROPASS SUPPLEMENT TO THE INTERMEDIATE LEVEL SPECIALIZATION COURSE CERTIFICATE

## NAME OF THE SPECIALIZATION COURSE

*Specialization course in hybrid and electric vehicles maintenance*

## DESCRIPTION OF THE SPECIALIZATION COURSE

### The holder has acquired the General Competence related to:

Perform maintenance operations, assembly of elements and assemblies, troubleshooting, repair, verification and adjustment, in vehicles with hybrid and electric propulsion systems, following technical specifications for safety and environmental protection, complying with current regulations.

### Within this framework, each PROFESSIONAL MODULE includes the following LEARNING OUTCOMES acquired by the holder.

#### "Safety in hybrid and electric vehicles".

The titleholder:

- Describes the safety regulations related to vehicle maintenance workshops, relating them to dangerous situations and accidents that can occur in the maintenance of hybrid and electric vehicles.
- Characterizes the effects of a high voltage electrical discharge on the handling of items in hybrid and electric vehicles, applying the individual and collective protection equipment according to current regulations.
- Cordons off the high voltage work area and identifies the vehicle, in order to carry out the interventions according to the safety conditions established in the regulations in force.
- Positions the safety elements in the hybrid or electric vehicle, performing the functions of a companion.
- Positions the safety elements in the hybrid or electric vehicle, performing the functions of safety escort of the next higher level in the process of deactivation of high voltage and checks the absence of voltage, complying with the established safety regulations.
- Verifies the disconnection and indicates with condemnation discs the elements that must not be maneuvered in electric and hybrid vehicles, according to current regulations.
- Applies the rules of occupational risk prevention and environmental protection, identifying occupational hazards inherent in the handling of electric and hybrid vehicles to prevent them.

#### "Propulsion systems in hybrid and electric vehicles".

The titleholder:

- Characterizes the operation of the different hybrid and electric propulsion systems, interpreting the variations of their characteristic parameters and the functionality of the elements that constitute them.
- Applies the safety protocols established in the performance of maintenance work, to electric or hybrid vehicles without voltage, complying with current safety regulations.
- Performs the maintenance of electric propulsion systems, carrying out the controls and processes established in the technical documentation, complying with safety regulations and with the established quality.
- Maintains pure hybrid and plugin hybrid propulsion systems, applying the required methods and techniques, restoring established functionality to components.
- Applies maintenance techniques in fuel cell propulsion systems, using the necessary equipment, tools and tooling, following technical specifications and complying with safety regulations and quality established.
- Applies the rules of occupational risk prevention and environmental protection, identifying occupational hazards in the maintenance processes of propulsion systems in electric and hybrid vehicles, to prevent them.

#### "High voltage electrical systems, batteries and recharging".

The titleholder:

- Identifies the elements of high voltage electrical systems, batteries and recharging circuit in hybrid and electric vehicles, describing the functionality and fundamental characteristics of each one of them.
- Performs testing and maintenance of high voltage electrical systems, complying with established safety and quality standards.
- Performs the disassembly and assembly of the high voltage battery of electric vehicles, applying the following techniques required and complying with the safety regulations in force.
- Applies maintenance and testing techniques to external high voltage battery recharging systems, complying with the established safety and quality standards.

- Applies the occupational risk prevention and environmental protection regulations, identifying the occupational risks associated with the maintenance processes of high voltage electrical systems, batteries and recharging, in order to prevent them.

#### **"Force transmission and thermal management."**

The titleholder:

- Characterizes the operation of the different power transmission and thermal management systems in electric and hybrid vehicles, interpreting the variations of their characteristic parameters and the functionality of their constituent elements.
- Performs the maintenance of singlegear automatic transmissions and dual clutch transmissions with the required quality, following the controls and processes established in the technical documentation.
- Maintains regenerative, electromagnetic, ABS and hydraulic brake systems, applying the required techniques to restore established functionality to the equipment.
- Applies the necessary techniques and methods in the maintenance processes of cabin air conditioning systems, using the necessary equipment, tools and tooling, following technical specifications.
- Performs maintenance on battery cooling systems and high voltage electrical elements, complying with established safety and quality standards.
- Applies the rules of occupational risk prevention and environmental protection, identifying the occupational hazards associated with the maintenance processes of power transmission and thermal management systems.

#### **"Workplace training"**

The titleholder:

- Identifies the structure and organization of the company, relating them to the production and commercialization of the services obtained.
- Applies ethical and work habits in the development of his/her professional activity, in accordance with the characteristics of the job position and with the procedures established in the company.
- Performs maintenance of hybrid and electric propulsion systems, following technical specifications, current safety regulations and the corresponding established protocols.
- Performs maintenance of high voltage electrical systems, batteries and recharging in hybrid and hybrid vehicles using the appropriate techniques and means in each case and complying with the regulations in force.
- Performs maintenance of power transmission and regenerative braking systems, performing diagnostics to identify the elements to be adjusted, repaired or replaced.
- Performs maintenance of the vehicle's thermal management systems, carrying out checks to identify the elements to be adjusted, repaired or replaced.

### **JOBS YOU CAN PERFORM WITH THIS SPECIALIZATION COURSE**

The most relevant occupations and jobs are as follows:

- Electric vehicle maintenance technician.
- Hybrid vehicle maintenance technician.
- Vehicle accessories installation technician.
- Dealer/distributor of spare parts and diagnostic equipment.
- Assembly technician in vehicle manufacturing companies.
- Pneumatic and hydraulic systems repair technician.
- Transmission and brake systems repair technician.
- Steering and suspension systems repair technician.
- Electrical and charging systems repair technician.
- Operator of spare parts manufacturing companies.
- Operator of authorized treatment centers (CATs) for electric and/or hybrid vehicles.

### **CERTIFICATE ISSUANCE, ACCREDITATION AND LEVEL**

**Body issuing the certificate of the intermediate level specialization course on behalf of the King:** Ministry of Education and Vocational Training or the autonomous communities within the scope of their own competences. The certificate has academic and professional effects valid throughout the State.

**Official course duration:** 650 hours.

**Certificate level (national or international):**

- NATIONAL: Post-compulsory secondary education.
- INTERNATIONAL:
  - Level P- 3. 5.4 of the International Standard Classification of Education (ISCED P-3.5.4).
  - Level 4C of the European Qualifications Framework (EQF4C).

**Entry requirements:** To access the specialization course in Hybrid and Electric Vehicle Maintenance it is necessary to hold one of the following degrees:

- a) Degree of Technician in Electromechanics of Automobile Vehicles, established by Royal Decree 453/2010, of April 16.
- b) Degree of Technician in Machinery Electromechanics, established by Royal Decree 255/2011, of February 28.
- c) Degree of Technician in Railway Rolling Stock Maintenance, established by the Royal Decree 1145/2012, of July 27.

**Legal Basis.** Regulations establishing the certificate:

- Minimum teaching requirements established by the State: Royal Decree 281/2021, of April 20, establishing the Specialization Course in Hybrid and Electric Vehicle Maintenance and setting the basic aspects of the curriculum.

**Explanatory note:** This document is intended as additional information to title in question, but has no legal validity whatsoever. It may be accompanied by an Annex I to be completed by the corresponding Autonomous Community.

## INFORMATION ABOUT THE EDUCATION SYSTEM

