

National Unit Specification: general information

UNIT	Automotive: Electrical and Electronic Systems (Intermediate 2)
NUMBER	DE47 11
COURSE	Scottish Progression Award (SPA) in Vehicle Maintenance and Repair

SUMMARY

This unit will be suitable for candidates who need to develop and apply skills and knowledge associated with the repair, servicing and maintenance of vehicles at Intermediate 2 level. The unit will enable the candidate to acquire essential skills in the identification of the components used within the starting, charging and lighting systems fitted to vehicles.

The unit is derived from Automotive Skills' National Occupational Standards Units:

Unit 10 – Remove and replace units and components
Unit 11 – Carry out routine vehicle maintenance
Unit 19 – Inspect vehicles

It also applies to the units relating to vehicle maintenance and repair S/NVQs and Modern Apprenticeships.

It is designed to meet the knowledge requirements of Automotive Skills' Technical Certificate Specification – (Phase 1):

LV19 – Electrical and Electronic Systems (1)

and to provide progression towards the related S/NVQs and Modern Apprenticeships.

OUTCOMES

1. Identify the components of the battery charging, engine starting and lighting systems.
2. Explain the operation of the battery charging, engine starting and lighting systems.

Administrative Information

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National Unit Specification: general information (cont)

RECOMMENDED ENTRY

Entry is at the discretion of the centre, but a good standard in communication skills would be desirable. It would also be beneficial for candidates to have a practical aptitude for vehicle maintenance and repair

CREDIT VALUE

0.5 Credits at Intermediate 2 (3 SCQF points at SCQF level 5*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

CORE SKILLS

Information on the automatic certification of any core skills in this unit is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, publication code BA0906).

National Unit Specification: statement of standards

UNIT Automotive: Electrical and Electronic Systems (Intermediate 2)

Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to the Scottish Qualifications Authority.

OUTCOME 1

Identify the components of the battery charging, engine starting and lighting systems.

Performance criteria

- a) Correctly identify the main components of the charging system.
- b) Correctly identify the main components of the engine starting system.
- c) Correctly identify the common electrical symbols used in the wiring diagram.
- d) Correctly identify the location of the main components and the source of supply and earth using a circuit diagram.

OUTCOME 2

Explain the operation of the battery charging, engine starting and lighting systems.

Performance criteria

- a) Correctly explain the operation of the battery and charging system.
- b) Correctly explain the operation of the engine starting system.
- c) Correctly explain the operation of the lighting systems.

EVIDENCE REQUIREMENTS FOR THE UNIT

Written evidence of the candidate's ability to show a clear understanding of the skills and knowledge associated with the repair, servicing and maintenance of vehicles, including the identification and operation of the:

- 1) battery charging system
- 2) engine starting system
- 3) lighting systems

The candidate should produce sufficient correct responses to achieve an overall pass of 70% for the unit.

National Unit Specification: support notes

UNIT Automotive: Electrical and Electronic Systems (Intermediate 2)

This part of the unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this unit is at the discretion of the centre, the notional design length is 20 hours.

GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT

This unit is designed to develop the basic skills and knowledge associated with the repair, servicing and maintenance of vehicles at Intermediate 2.

The aim of this unit is to deliver the knowledge requirements of Automotive Skills' Technical Certificate – Electrical and Electronic Systems (Phase 1). It would however be advantageous to deliver it in a practical setting.

Outcome 1

Identification of the components of the battery charging, engine starting and lighting systems.

Battery and Charging:

- battery
- alternator
- warning lamp
- ignition switch
- drive belt
- cables.

Engine Starting:

- battery
- starter motor
- ignition/start switch
- solenoid
- cables.

Lighting Systems:

- direction indicators
- flasher unit
- switches
- relay
- bulb types
- stop lights
- side/tail lights
- rear fog lights
- headlights (main/dip).

National Unit Specification: support notes (cont)

UNIT Automotive: Electrical and Electronic Systems (Intermediate 2)

Common Symbols:

- battery
- alternator
- switch
- solenoid
- motor
- bulb
- relay
- flasher unit
- conductors
- connectors
- earth
- fuse

Outcome 2

Explanation of the operation of the battery charging, engine starting and lighting systems.

Battery and Charging

- battery, alternator

Engine Starting:

- pre-engaged starter motor

Lighting:

- direction indicators
- flasher unit
- switches
- relays
- bulbs
- stop lights
- side/tail light
- rear fog lights
- headlights (main/dip)

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

The unit should be taught in a practical workshop / demonstration and technology room situation with access to a range of vehicles and their wiring diagrams.

It is designed to support the delivery of other units within the Scottish Progression Award (SPA) and delivery could be integrated with other units.

Outcomes 1 and 2

Candidates could be given the opportunity to examine the components and layout of a vehicle's charging, starting and lighting systems including tracing the circuits on a vehicle.

National Unit Specification: support notes (cont)

UNIT Automotive: Electrical and Electronic Systems (Intermediate 2)

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Assessment of the knowledge could take the form of a multiple – choice test to cover all outcomes.

SPECIAL NEEDS

This unit specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering special alternative outcomes for units. For information on these, please refer to the SQA document *Guidance on Special Assessment Arrangements* (SQA, publication code AA0645).