QUALIFICATION HANDBOOK

Level 2 Certificate and Diploma in Light Vehicle Maintenance & Repair Principles (4290-12/17)

August 2017 Version 3.3

City & Guilds

Qualification at a glance

Subject area	**Vehicle Maintenance and Repair**
City & Guilds number	4290
Age group approved	4290-12 - 16+ 4290-17 - 14+
Entry requirements	There are no entry requirements
Assessment	Online multiple choice tests (graded Pass, Merit, Distinction) and assignments (graded Pass)
Fast track	Not available; automatic approval applies in some cases
Support materials	Centre handbook SmartScreen Exam Success book Online practice tests Practical assessment workbook Practical training workbook
Registration and certification	See Online Catalogue/Walled Garden for last dates.

Title and level	GLH	TQT	City & Guilds number	Accreditation number
Level 2 Certificate in Light Vehicle Maintenance and Repair Principles	310	340	4290-17	600/1177/4
Level 2 Diploma in Light Vehicle Maintenance and Repair Principles	640	780	4290-12	500/9707/6

Version and date	Change detail	Section
2.3 September 2011	Unit aim amended in unit 103	Units
Version 3 (August 2012)	General clarification of Unit Range, grammatical errors corrected. Addition of statements in Section 4.	Various
Version 3.1 (October 2012)	Unit 152 numbered correctly	Units
Version 3.2 (September 2013)	Unit supporting information updated with introductory text	Units
3.3 August 2017	Added TQT details Deleted QCF	**Qualification at a glance, Structure** **Throughout**

Contents

1	Introduction	6
2	Centre requirements	10
3	Delivering the qualification	12
4	Assessment	13
5	Units	17
Unit 001	Skills in health, safety and good housekeeping in the automotive environment	19
Unit 003	Skills in supporting job roles in the automotive work environment	22
Unit 004	Skills in materials, fabrication, tools and measuring devices in the automotive environment	25
Unit 008	Skills to identify and agree motor vehicle customer service needs	28
Unit 051	Knowledge of health, safety and good housekeeping in the automotive environment	31
Unit 053	Knowledge of support for job roles in the automotive work environment	40
Unit 054	Knowledge of materials, fabrication, tools and measuring devices in the automotive environment	44
Unit 058	Knowledge of how to identify and agree motor vehicle customer service needs	48
Unit 101	Skills in routine light vehicle maintenance	52
Unit 102	Skills in removing and replacing light vehicle engine units and components	55
Unit 103	Skills in removing and replacing light vehicle electrical units and components	58
Unit 104	Skills in removing and replacing light vehicle chassis units and components	61
Unit 105	Skills in inspecting light vehicles using prescribed methods	64
Unit 111	Skills in overhauling light vehicle engine mechanical units	67
Unit 112	Skills in removing and replacing light vehicle driveline units and components	70
Unit 121	Skills in overhauling light vehicle transmission units	73
Unit 131	Skills in overhauling light vehicle steering and suspension units	76
Unit 151	Knowledge of routine light vehicle maintenance	79
Unit 152	Knowledge of light vehicle engine mechanical, lubrication and cooling system units and components	83

Unit 153	**Knowledge of removing and replacing light vehicle electrical units and components**	**89**
Unit 154	**Knowledge in removing and replacing light vehicle chassis units and components**	**97**
Unit 155	**Knowledge of inspecting light vehicles using prescribed methods**	**105**
Unit 161	**Knowledge of overhauling light vehicle engine units**	**109**
Unit 162	**Knowledge of light vehicle transmission and driveline units and components**	**113**
Unit 171	**Knowledge of overhauling light vehicle transmission units**	**118**
Unit 172	**Knowledge of light vehicle fuel, ignition, air and exhaust system units and components**	**121**
Unit 181	**Knowledge of overhauling light vehicle steering and suspension units**	**128**
Unit 218	**Skills in removing and fitting of basic light vehicle mechanical, electrical and trim (MET) components and non permanently fixed vehicle body panels**	**131**
Unit 268	**Knowledge in removing and fitting of basic light vehicle mechanical, electrical and trim (MET) components and non permanently fixed vehicle body panels**	**135**
Appendix 1	**Relationships to other qualifications**	**140**
Appendix 2	**Sources of general information**	**141**

1 Introduction

This document tells you what you need to do to deliver the qualifications:

Area	Description
Who are the qualifications for?	Candidates wanting to develop some of the key skills and understanding in motor vehicle systems. Successful candidates will have the basic skills needed to apply for an automotive apprenticeship or similar engineering pathway. These qualifications could also be used as an 'interest' course for a wide range of learners.
What do the qualifications cover?	They allow candidates to learn, develop and practise the skills required for employment and/or career progression in the automotive industry.
Are the qualifications part of a framework or initiative?	These qualifications are part of the Automotive Maintenance and Repair Young and Intermediate Apprenticeship Frameworks (framework 1) which replaced the current framework 4 from April 2011.
Who did we develop the qualification with?	These qualifications were developed in collaboration with the Institute of the Motor Industry (IMI), the sector skills council for the automotive retail industry and other awarding organisations.
What opportunities for progression are there?	They allow candidates to progress into employment or to the following City & Guilds qualifications: • 4290-13 Level 3 Diploma in Light Vehicle Maintenance & Repair Principles • 4270 -12 City & Guilds Level 2 Diploma in Light Vehicle Maintenance & Repair Competence • 4270-13 City & Guilds Level 3 Diploma in Light Vehicle Maintenance & Repair Competence

Structure

These qualifications replaced the existing City & Guilds Level 2 Certificate/Diploma in Automotive Vehicle Maintenance and Repair – Light Vehicle (4101-46) which closed for registration on 31/03/2011.

Full qualification certificates will be awarded to successful candidates on completion of the required combinations of units. Candidates completing one or more units, rather than the full qualification(s), will receive a Certificate of Unit Credit (CUC).

Qualification	Total credits	Credits from mandatory units	Credits from optional units
City & Guilds Level 2 Certificate in Light Vehicle Maintenance & Repair Principles (4290-17)	**34**	**26**	**8 (min)**
		001 and 051, 004 and 054, 101 and 151	- 102 and (152 or 902) and (172 or 918) or - 103 and (153 or 903), or - 104 and (154 or 904), or - 105 and (155 or 905), or - 112 and (162 or 912)
City & Guilds Level 2 Diploma in Light Vehicle Maintenance & Repair Principles (4290-12)	**78**	**73**	**5 (min)**
		001, 003, 004, 051, 053, 054, 101, 102, 103, 104, 151, 152, 153, 154, 162, 172	- 008 and 058, or - 105 and 155, or - 111 and 161, or - 112, or - 121 and 171, or - 131 and 181, or - 218 and 268

713 complies with the requirements of the pathways to Apprenticeship Programme in Wales.

Unit accreditation number	City & Guilds unit	Unit title	Credit value
Y/601/7254	4290-001	Skills in health, safety and good housekeeping in the automotive environment	7
J/601/6262	4290-003	Skills in supporting job roles in the automotive work environment	5
Y/601/6279	4290-004	Skills in materials, fabrication, tools and measuring devices used in the automotive environment	7
M/601/6286	4290-008	Skills to identify and agree motor vehicle customer service needs	5
D/601/6171	4290-051	Knowledge of health, safety and good housekeeping in the automotive environment	3
T/601/6175	4290-053	Knowledge of support for job roles in the automotive work environment	3
K/601/6237	4290-054	Knowledge of materials, fabrication, tools and measuring devices used in the automotive environment	4
R/601/6247	4290-058	Knowledge of how to identify and agree motor vehicle customer service needs	5
H/601/3871	4290-101	Skills in routine light vehicle maintenance	2
K/601/3872	4290-102	Skills in removing and replacing light vehicle engine units and components	5
T/601/3874	4290-103	Skills in removing and replacing light vehicle electrical units and components	5

Unit accreditation number	City & Guilds unit	Unit title	Credit value
F/601/3876	4290-104	Skills in removing and replacing light vehicle chassis units and components	5
A/601/3889	4290-105	Skills in inspecting light vehicles using prescribed methods	4
L/601/3881	4290-111	Skills in overhauling light vehicle engine mechanical units	2
K/601/3886	4290-112	Skills in removing and replacing light vehicle driveline units and components	5
D/601/3884	4290-121	Skills in overhauling light vehicle transmission units	2
H/601/3885	4290-131	Skills in overhauling light vehicle steering and suspension units	2
F/601/3716	4290-151	Knowledge of routine light vehicle maintenance	3
R/601/3719	4290-152	Knowledge of light vehicle engine mechanical, lubrication and cooling system units and components	3
T/601/3731	4290-153	Knowledge of removing and replacing light vehicle electrical units and components	6
A/601/3732	4290-154	Knowledge of removing and replacing light vehicle chassis units and components	6
H/601/3742	4290-155	Knowledge of inspecting light vehicles using prescribed methods	4
R/601/3736	4290-161	Knowledge of overhauling light vehicle engine units	3
Y/601/3740	4290-162	Knowledge of light vehicle transmission and driveline units and components	6
Y/601/3737	4290-171	Knowledge of overhauling light vehicle transmission units	3
H/601/3725	4290-172	Knowledge of light vehicle fuel, ignition, air and exhaust system units and components	3
D/601/3738	4290-181	Knowledge of overhauling light vehicle steering and suspension units	3
K/601/3869	4290-218	Skills in removing and fitting of basic light vehicle mechanical, electrical and trim (MET) components and non permanently fixed vehicle body panels	3
F/601/3747	4290-268	Knowledge of removing and fitting basic light vehicle mechanical, electrical and trim (MET) components and non permanently fixed vehicle body panels	2

Total Qualification Time

Total Qualification Time (TQT) is the total amount of time, in hours, expected to be spent by a Learner to achieve a qualification. It includes both guided learning hours (which are listed separately) and hours spent in preparation, study and assessment.

Title and level	GLH	TQT
Level 2 Certificate in Light Vehicle Maintenance and Repair Principles	310	340
Level 2 Diploma in Light Vehicle Maintenance and Repair Principles	640	780

2 Centre requirements

Approval

Centres already approved to offer the Level 2 Certificate/Diploma in Maintenance and Repair - Light Vehicle (4101-46) will be automatically approved to register and certificate candidates on the 4290-12 (unless the centre is already subject to sanctions).

For all other cases, centres will need to gain both centre and qualification approval. Please refer to the *Centre guide* and *Providing City & Guilds Qualifications* for further information.

Centre staff should familiarise themselves with the structure, content and assessment requirements of the qualifications before designing a course programme.

Physical resources and site agreements

Centres must have access to sufficient equipment in the college, training centre or workplace to ensure candidates have the opportunity to cover all of the practical activities.

Centre staffing

Staff delivering these qualifications must be able to demonstrate that they meet the following occupational expertise requirements. They should:

- be occupationally competent or technically knowledgeable in the area(s) for which they are delivering training and/or have experience of providing training. This knowledge must be to the same level as the training being delivered
- have recent relevant experience in the specific area they will be assessing
- have credible experience of providing training.

Centre staff may undertake more than one role, eg tutor and assessor or internal verifier, but cannot internally verify their own assessments.

Assessor and verifiers

While the Assessor/Verifier (A/V) units are valued as qualifications for centre staff, they are not currently a requirement for this qualification.

Continuing professional development (CPD)

Centres must support their staff to ensure that they have current knowledge of the occupational area, that delivery, mentoring, training, assessment and verification is in line with best practice, and that it takes account of any national or legislative developments.

Candidate entry requirements

City & Guilds does not set entry requirements for these qualifications. However, centres must ensure that candidates have the potential and opportunity to gain the qualifications successfully.

Please note that for funding purposes, candidates should not be entered for a qualification of the same type, content and level as that of a qualification they already hold.

Age restrictions

The Level 2 Certificate in Light Vehicle Maintenance & Repair (4290-17) is approved for candidates aged 14+ whereas the Level 2 Diploma (4290-12) is only approved for candidates aged 16+.

Guidance on risk management of pre 16 candidates

Centres offering the City & Guilds Level 2 Certificate/Diploma in Light Vehicle Maintenance & Repair (4290) to candidates under the age of 16 must assume responsibility for the safe delivery of the qualification. This will include those units that require using and working with power tools and machinery and using and working under lifts and hoists.

In order to ensure that the risk related to the delivery and assessment of this qualification is managed appropriately, City & Guilds requires the Head of Centre to provide a satisfactory risk assessment. The risk assessment should outline those activities within the units which, specific to the centre, may pose a risk or hazard to the safety of the candidate and identify how these risks/hazards will be managed to reduce or alleviate risk.

The risk assessment should be forwarded to your local City & Guilds regional office to be held on file. A copy should be retained by the centre and made available to a City & Guilds external verifier or representative on request.

3 Delivering the qualification

Initial assessment and induction

An initial assessment of each candidate should be made before the start of their programme to identify:

- if the candidate has any specific training needs,
- support and guidance they may need when working towards their qualification.
- any units they have already completed, or credit they have accumulated which is relevant to the qualification.
- the appropriate type and level of qualification.

We recommend that centres provide an induction programme so the candidate fully understands the requirements of the qualification, their responsibilities as a candidate, and the responsibilities of the centre. This information can be recorded on a learning contract.

Support materials

The following resources are available for these qualifications:

Description	How to access
Centre handbook	**www.cityandguilds.com/automotive**
Practical assessment workbook	**www.cityandguilds.com/automotive**
Practical training workbook	**www.cityandguilds.com/automotive**
Exam Success book	Walled Garden (TL024290)
Online practice tests	Walled Garden
SmartScreen	**www.smartscreen.co.uk**

4 Assessment

Assessment of the qualification

City & Guilds has written the following assessments to use with this qualification:

- Assignments (practical assessment workbooks) comprising of practical tasks and knowledge based questions to cover all learning outcomes. Graded Pass only.
- Online multiple choice tests graded as Pass, Merit, Distinction.
- Assignments can be downloaded from **www.cityandguilds.com/automotive**. These assessments are carried out in centres and must be completed to current industry standards and practice. It is important to note that although the units within these qualifications bear a close relationship to the VCQ units, they do not imply occupational competence.

Time constraints

The following must be applied to the assessment of this qualification:

- Candidates must complete their assessments within their registration period.

Test specifications

Summary test specifications for all 4290 online tests can be found in the *Automotive online test specifications* document, downloadable from the 4290 website.

Recognition of prior learning (RPL)

Proxy units/credit transfer

Learners transferring from City & Guilds 4101 NQF qualifications or from another awarding organisation may be exempt from taking the 4290/4270/4291/4271 online multiple choice tests, on production of a valid certificate of equivalent units achieved. Proxy units are available in these circumstances. Please note that a certificate of unit credit (CUC) is not available when claiming a proxy unit. For more information on credit transfer please refer to our 9420 Automotive Apprenticeship Framework centre guide available from www.cityandguilds.com

Full details of the assessment requirements relating to these qualifications can be obtained directly from the Institute of the Motor Industry (IMI) http://www.motor.org.uk

Level 2 Certificate/Diploma in Light Vehicle Maintenance & Repair Principles

City & Guilds unit number	Level	Unit title	Credit value	Assessment method
4290-001	Level 2	Skills in health, safety and good housekeeping in the automotive environment	7	Assignment
4290-003	Level 3	Skills in supporting job roles in the automotive work environment	5	Assignment
4290-004	Level 2	Skills in materials, fabrication, tools and measuring devices used in the automotive environment	7	Assignment
4290-008	Level 3	Skills to identify and agree motor vehicle customer service needs	5	Assignment
4290-051	Level 2	Knowledge of health, safety and good housekeeping in the automotive environment	3	Assignment
4290-053	Level 3	Knowledge of support for job roles in the automotive work environment	3	Assignment
4290-054	Level 2	Knowledge of materials, fabrication, tools and measuring devices used in the automotive environment	4	Assignment
4290-058	Level 3	Knowledge of how to Identify and agree motor vehicle customer service needs	5	Assignment
4290-101	Level 2	Skills in routine light vehicle maintenance	2	Assignment
4290-102	Level 2	Skills in removing and replacing light vehicle engine units and components	5	Assignment
4290-103	Level 2	Skills in removing and replacing light vehicle electrical units and components	5	Assignment
4290-104	Level 2	Skills in removing and replacing light vehicle chassis units and components	5	Assignment
4290-105	Level 2	Skills in inspecting light vehicles using prescribed methods	4	Assignment

City & Guilds unit number	Level	Unit title	Credit value	Assessment method
4290-111	Level 3	Skills in overhauling light vehicle engine mechanical units	2	Assignment
4290-112	Level 2	Skills in removing and replacing light vehicle driveline units and components	5	Assignment
4290-121	Level 3	Skills in overhauling light vehicle transmission units	2	Assignment
4290-131	Level 3	Skills in overhauling light vehicle steering and suspension units	2	Assignment
4290-151	Level 2	Knowledge of routine light vehicle maintenance	3	Multiple choice test
4290-152	Level 2	Knowledge of light vehicle engine mechanical, lubrication and cooling system units and components	3	Multiple choice test
4290-153	Level 2	Knowledge of removing and replacing light vehicle electrical units and components	6	Multiple choice test
4290-154	Level 2	Knowledge of removing and replacing light vehicle chassis units and components	6	Multiple choice test
4290-155	Level 2	Knowledge of inspecting light vehicles using prescribed methods	4	Multiple choice test
4290-161	Level 3	Knowledge of overhauling light vehicle engine units	3	Multiple choice test
4290-162	Level 2	Knowledge of light vehicle transmission and driveline units and components	6	Multiple choice test
4290-171	Level 3	Knowledge of overhauling light vehicle transmission units	3	Multiple choice test
4290-172	Level 2	Knowledge of light vehicle fuel, ignition, air and exhaust system units and components	3	Multiple choice test
4290-181	Level 3	Knowledge of overhauling light vehicle steering and suspension units	3	Multiple choice test

City & Guilds unit number	Level	Unit title	Credit value	Assessment method
4290-218	Level 2	Skills in removing and fitting of basic light vehicle mechanical, electrical and trim (MET) components and non permanently fixed vehicle body panels	3	Assignment
4290-268	Level 2	Knowledge of removing and fitting basic light vehicle mechanical, electrical and trim (MET) components and non permanently fixed vehicle body panels	2	Assignment

5 Units

Structure of units

These units each have the following:

- City & Guilds reference number
- unit accreditation number (UAN)
- title
- level
- credit value
- unit aim
- relationship to NOS
- learning outcomes which are comprised of a number of assessment criteria
- unit range.

Summary of units

City & Guilds unit number	Unit title	Unit accreditation number (UAN)
4290-001	Skills in health, safety and good housekeeping in the automotive environment	Y/601/7254
4290-003	Skills in supporting job roles in the automotive work environment	J/601/6262
4290-004	Skills in materials, fabrication, tools and measuring devices used in the automotive environment	Y/601/6279
4290-008	Skills to identify and agree motor vehicle customer service needs	M/601/6286
4290-051	Knowledge of health, safety and good housekeeping in the automotive environment	D/601/6171
4290-053	Knowledge of support for job roles in the automotive work environment	T/601/6175
4290-054	Knowledge of materials, fabrication, tools and measuring devices used in the automotive environment	K/601/6237
4290-058	Knowledge of how to identify and agree motor vehicle customer service needs	R/601/6247
4290-101	Skills in routine light vehicle maintenance	H/601/3871
4290-102	Skills in removing and replacing light vehicle engine units and components	K/601/3872

City & Guilds unit number	Unit title	Unit accreditation number (UAN)
4290-103	Skills in removing and replacing light vehicle electrical units and components	T/601/3874
4290-104	Skills in removing and replacing light vehicle chassis units and components	F/601/3876
4290-105	Skills in inspecting light vehicles using prescribed methods	A/601/3889
4290-111	Skills in overhauling light vehicle engine mechanical units	L/601/3881
4290-112	Skills in removing and replacing light vehicle driveline units and components	K/601/3886
4290-121	Skills in overhauling light vehicle transmission units	D/601/3884
4290-131	Skills in overhauling light vehicle steering and suspension units	H/601/3885
4290-151	Knowledge of routine light vehicle maintenance	F/601/3716
4290-152	Knowledge of light vehicle engine mechanical, lubrication and cooling system units and components	R/601/3719
4290-153	Knowledge of removing and replacing light vehicle electrical units and components	T/601/3731
4290-154	Knowledge of removing and replacing light vehicle chassis units and components	A/601/3732
4290-155	Knowledge of inspecting light vehicles using prescribed methods	H/601/3742
4290-161	Knowledge of overhauling light vehicle engine units	R/601/3736
4290-162	Knowledge of light vehicle transmission and driveline units and components	Y/601/3740
4290-171	Knowledge of overhauling light vehicle transmission units	Y/601/3737
4290-172	Knowledge of light vehicle fuel, ignition, air and exhaust system units and components	H/601/3725
4290-181	Knowledge of overhauling light vehicle steering and suspension units	D/601/3738
4290-218	Skills in removing and fitting of basic light vehicle mechanical, electrical and trim (MET) components and non permanently fixed vehicle body panels	K/601/3869
4290-268	Knowledge of removing and fitting basic light vehicle mechanical, electrical and trim (MET) components and non permanently fixed vehicle body panels	F/601/3747

Unit 001 Skills in health, safety and good housekeeping in the automotive environment

UAN:	**Y/601/7254**
Level:	2
Credit value:	7
GLH:	60
Relationship to NOS:	This unit is linked to G1 Contribute to Housekeeping in Motor Vehicle Environment and G2 Reduce Risks to Health and Safety in the Motor Vehicle Environment.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit will enable the learner to develop the skills required to: • carry out day to day work area cleaning, clearing away, dealing with spillages and disposal of waste, used materials and debris. • identify hazards and risks in the automotive environment and complying with relevant legislation and good practice. • work safely at all times within the automotive environment, both as an individual and with others.

Learning outcome	**The learner will:**
1 be able to use correct personal and vehicle protection within the automotive work environment	
Assessment criteria	
The learner can: 1.1 select and use personal protective equipment throughout activities. To include appropriate protection of: a. eyes b. ears c. head d. skin e. feet f. hands	

g. lungs 1.2 select and use vehicle protective equipment throughout all activities.

Learning outcome	The learner will:
2 be able to carry out effective housekeeping practices in the automotive work environment	
Assessment criteria	
The learner can: 2.1 select and use cleaning equipment which is of the right type and suitable for the task 2.2 use utilities and appropriate consumables, avoiding waste 2.3 use materials and equipment to carry out cleaning and maintenance duties in allocated work areas, following automotive work environment policies, schedules and manufacturers' instructions 2.4 perform housekeeping activities safely and in a way which minimizes inconvenience to customers and staff. 2.5 keep the work area clean and free from debris and waste materials 2.6 keep tools and equipment fit for purpose by regular cleaning and keeping tidy 2.7 dispose of used cleaning agents, waste materials and debris to comply with legal and workplace requirements.	

Learning outcome	The learner will:
3 be able to recognise and deal with dangers in order to work safely within the automotive workplace	
Assessment criteria	
The learner can: 3.1 name and locate the responsible persons for health and safety in their relevant workplace 3.2 identify and report working practices and hazards which could be harmful to themselves or others 3.3 carry out safe working practices whilst working with equipment, materials and products in the automotive environment 3.4 rectify health and safety risks encountered at work, within the scope and capability of their job role.	

Learning outcome	The learner will:
4 be able to conduct themselves responsibly	
Assessment criteria	
The learner can: 4.1 show personal conduct in the workplace which does not endanger the health and safety of themselves or others 4.2 display suitable personal presentation at work which ensures the health and safety of themselves and others at work.	

Unit 001 Skills in health, safety and good housekeeping in the automotive environment

Assessment requirements

The assessment requirements are shown in full in the assessment documentation.

Unit 003 Skills in supporting job roles in the automotive work environment

UAN:	**J/601/6262**
Level:	3
Credit value:	5
GLH:	40
Relationship to NOS:	This unit is linked to G3 Maintain Working Relationships in the Motor Vehicle Environment.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim	This unit will help the learner develop the skills required to keep good working relationships with all colleagues and customers in the automotive work environment by using effective communication and support.

Learning outcome	**The learner will:**
1 be able to work effectively within the organisational structure of the automotive work environment	
Assessment criteria	
The learner can 1.1 respond promptly and willingly to requests for assistance from customers and colleagues 1.2 refer customers and colleagues to the correct person should requests fall outside their responsibility and capability.	

Learning outcome	**The learner will:**
2 be able to obtain and use information in order to support their job role within the automotive work environment	
Assessment criteria	
The learner can 2.1 select and use legal and technical information, in an automotive work environment.	

Learning outcome	The learner will:
3 be able to communicate with and support colleagues and customers effectively within the automotive work environment	
Assessment criteria	
The learner can 3.1 use methods of communication with customers and colleagues which meet their needs 3.2 give customers and colleagues accurate information 3.3 make requests for assistance from or to customers and colleagues clearly and courteously.	

Learning outcome	The learner will:
4 be able to develop and keep good working relationships in the automotive work environment	
Assessment criteria	
The learner can 4.1 contribute to team work by initiating ideas and co-operating with customers and colleagues 4.2 treat customers and colleagues in a way which shows respect for their views and opinions 4.3 make and keep achievable commitments to customers and colleagues 4.4 inform colleagues promptly of anything likely to affect their own work.	

Unit 003 Skills in supporting job roles in the automotive work environment

Assessment requirements

The assessment requirements are shown in full in the assessment documentation.

Unit 004 Skills in materials, fabrication, tools and measuring devices in the automotive environment

UAN:	**Y/601/6279**
Level:	2
Credit value:	7
GLH:	60
Relationship to NOS:	This unit is linked to G4 Use of hand tools and equipment in motor vehicle engineering.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit helps the learner to develop the skills required for: • the correct selection, care and use of key hand tools and measuring devices for modification, fabrication and repair in the automotive environment • the correct preparation and use of common work environment equipment • the correct selection and fabrication of materials used when modifying and repairing • the correct application of automotive engineering fabrication and fitting principles.

Learning outcome	**The learner will:**
1	be able to select, maintain and use hand tools and measuring devices in the automotive environment
Assessment criteria	
The learner can:	
1.1	select, maintain and use suitable hand tools safely when fabricating and fitting in the automotive workplace
1.2	select, maintain and use suitable measuring devices safely when fabricating and fitting in the automotive environment
1.3	select, maintain and use suitable PPE for fabrication, repair and fitting in the automotive environment
1.4	select, maintain and use suitable electrical measuring tools safely when repairing vehicles and components.

Learning outcome	The learner will:
2 be able to prepare and use common workshop equipment	
Assessment criteria	
The learner can: 2.1 use suitably maintained workshop equipment safely 2.2 use correct interpretation of 'safe working load' on lifting and supporting equipment 2.3 report any faulty or damaged tools and equipment to the relevant persons clearly and promptly 2.4 store work tools and equipment in a safe manner which permits ease of access and identification for use.	

Learning outcome	The learner will:
3 be able to select materials when fabricating, modifying and repairing vehicles and fitting components	
Assessment criteria	
The learner can: 3.1 select and use appropriate materials whilst constructing, fitting, modifying or repairing vehicles and components.	

Learning outcome	The learner will:
4 be able to apply automotive engineering, fabrication and fitting principles when modifying and repairing vehicles and components	
Assessment criteria	
The learner can: 4.1 use correct procedures when: a. filing b. tapping threads c. cutting plastics and metals d. drilling plastics and metals e. fitting 4.2 use appropriate techniques when fabricating, repairing and modifying vehicles and components 4.3 select and use: a. gaskets b. seals c. sealants d. fittings and fasteners 4.4 apply modification and repair techniques to automotive electrical circuits 4.5 select and use locking, fixing and fastening devices.	

Unit 004 Skills in materials, fabrication, tools and measuring devices in the automotive environment

Assessment requirements

The assessment requirements are shown in full in the assessment documentation.

Unit 008 Skills to identify and agree motor vehicle customer service needs

UAN:	**M/601/6286**
Level:	3
Credit value:	5
GLH:	40
Relationship to NOS:	This unit is linked to G8 Identify and Agree the Motor Vehicle Customer Needs.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit is about the skills required to: gain information from customers on their perceived needs; give advice and information and agree a course of action; contract for the agreed work and complete all necessary records and instructions.

Learning outcome	**The learner will:**
1 be able to obtain relevant information from the customer	
Assessment criteria	
The learner can: 1.1 obtain and interpret sufficient, relevant information, from the customer to make an assessment of their needs 1.2 clarify customer and vehicle needs by referring to vehicle data and operating procedures.	

Learning outcome	**The learner will:**
2 be able to provide relevant information to the customer	
Assessment criteria	
The learner can: 2.1 provide customers with accurate, current and relevant advice and information, in a form that the customer will understand 2.2 demonstrate techniques which encourage customers to ask questions and seek clarification during conversation.	

Learning outcome	The learner will:
3 be able to agree work undertaken with the customer	
Assessment criteria	
The learner can: 3.1 summarise and record work agreed with the customer, before accepting the vehicle 3.2 implement confirmation of the agreement by ensuring customer understanding.	

Learning outcome	The learner will:
4 be able to ensure recording systems are implemented correctly	
Assessment criteria	
The learner can: 4.1 use recording systems which are accurate and complete, in the required format and signed by the customer where necessary 4.2 perform the next stage in the process by passing on completed records to the correct person promptly 4.3 demonstrate correct procedures for customer approval where the contracted agreement is likely to be exceeded.	

Unit 008 Skills to identify and agree motor vehicle customer service needs

Assessment requirements

The assessment requirements are shown in full in the assessment documentation.

Unit 051 Knowledge of health, safety and good housekeeping in the automotive environment

UAN:	**D/601/6171**
Level:	2
Credit value:	3
GLH:	30
Relationship to NOS:	This unit is linked to G1 Contribute to Housekeeping in Motor Vehicle Environment and G2 Reduce Risks to Health and Safety in the Motor Vehicle Environment.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit enables the learner to develop an understanding of: • routine maintenance and cleaning of the automotive environment and using resources economically • health and safety legislation and duties of everyone in the motor vehicle environment. It will provide an appreciation of significant risks in the automotive environment and how to identify and deal with them. Once completed the learner will be able to identify hazards and evaluate and reduce risk.

Learning outcome	**The learner will:**
1 understand the correct personal and vehicle protective equipment to be used within the automotive environment	
Assessment criteria	
The learner can 1.1 explain the importance of wearing the types of PPE required for a range automotive repair activities 1.2 identify vehicle protective equipment for a range of repair activities 1.3 describe vehicle and personal safety considerations when working at the roadside.	

Learning outcome	The learner will:
2 understand effective housekeeping practices in the automotive environment	
Assessment criteria	
The learner can 2.1 describe why the automotive environment should be properly cleaned and maintained 2.2 describe requirements and systems which may be put in place to ensure a clean automotive environment. 2.3 describe how to minimise waste when using utilities and consumables 2.4 state the procedures and precautions necessary when cleaning and maintaining an automotive environment 2.5 describe the selection and use of cleaning equipment when dealing with general cleaning, spillages and leaks in the automotive environment 2.6 describe procedures for correct disposal of waste materials from an automotive environment 2.7 describe procedures for starting and ending the working day which ensure effective housekeeping practices are followed.	

Learning outcome	The learner will:
3 understand key health and safety requirements relevant to the automotive environment	
Assessment criteria	
The learner can 3.1 list the main legislation relating to automotive environment health and safety 3.2 describe the general legal duties of employers and employees required by current health and safety legislation 3.3 describe key, current health and safety requirements relating to the automotive environment 3.4 describe why workplace policies and procedures relating to health and safety are important.	

Learning outcome	The learner will:
4 understand about hazards and potential risks relevant to the automotive environment	
Assessment criteria	
The learner can 4.1 identify key hazards and risks in an automotive environment 4.2 describe policies and procedures for reporting hazards, risks, health and safety matters in the automotive environment 4.3 state precautions and procedures which need to be taken when working with vehicles, associated materials, tools and equipment 4.4 identify fire extinguishers in common use and which types of fire they should be used on 4.5 identify key warning signs and their characteristics that are found in the vehicle repair environment 4.6 state the meaning of common product warning labels used in an automotive environment.	

Learning outcome	The learner will:
5 understand personal responsibilities	
Assessment criteria	
The learner can 5.1 explain the importance of personal conduct in maintaining the health and safety of the individual and others 5.2 explain the importance of personal presentation in maintaining health safety and welfare.	

Unit 051 Knowledge of health, safety and good housekeeping in the automotive environment

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Economic use of resources

a. Consumable materials eg grease, oils, split pins, locking and fastening devices etc.

Requirement to maintain work area effectively

a. Cleaning tools and equipment to maximise workplace efficiency.
b. Requirement to carry out the housekeeping activities safely and in a way that minimises inconvenience to customers and staff.
c. Risks involved when using solvents and detergents.
d. Advantages of good housekeeping.

Spillages, leaks and waste materials

a. Relevance of safe systems of work to the storage and disposal of waste materials.
b. Requirement to store and dispose of waste, used materials and debris correctly.
c. Safe disposal of special / hazardous waste materials.
d. Advantages of recycling waste materials.
e. Dealing with spillages and leaks.

Basic legislative requirements

a. Provision and Use of Work Equipment Regulations 1992
b. Provision and Use of Work Equipment Regulations 1998 as applied to power presses
c. Pressure Systems and Transportable Gas Containers Regulations 1989
d. Electricity at Work Regulations 1989
e. Noise at Work Regulations 1989
f. Manual Handling Operations Regulations 1992
g. Health and Safety (Display Screen Equipment) Regulations 1992
h. Abrasive Wheels Regulations 1970
i. The Lifting Operations and Lifting Equipment Regulations 1998
Work at Height Regulations 2005.

Routine maintenance of the workplace

a. Trainee's personal responsibilities and limits of their authority with regard to work equipment.
b. Risk assessment of the workplace activities and work equipment.
c. Workplace person responsible for training and maintenance of workplace equipment.
d. When and why safety equipment must be used.
e. Location of safety equipment.
f. Particular hazards associated with their work area and equipment.
g. Prohibited areas.
h. Plant and machinery that trainees must not use or operate.
i. Why and how faults on unsafe equipment should be reported.
j. Storing tools, equipment and products safely and appropriately.
k. Using the correct PPE.
l. Following manufacturers' recommendations.
m. Location of routine maintenance information e.g. electrical safety check log.

Legislation relevant to Health and Safety

a. HASAWA
b. COSHH
c. EPA
d. Manual Handling Operations Regulations 1992
e. PPE Regulations 1992.

General regulations to include an awareness of:

a. Health and Safety (Display Screen Equipment) Regulations 1992
b. Health and Safety (First Aid) Regulations 1981
c. Health and Safety (Safety Signs and Signals) Regulations 1996
d. Health and Safety (Consultation with Employees) Regulations 1996
e. Employers Liability (Compulsory Insurance) Act 1969 and Regulations 1998
f. Confined Spaces Regulations 1997
g. Noise at Work Regulations 1989
h. Electricity at Work Regulations 1989
i. Electricity (Safety) Regulations 1994
j. Fire Precautions Act 1971
k. Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1985
l. Pressure Systems Safety Regulations 2000
m. Waste Management 1991
n. Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002
o. Control of Asbestos at Work Regulations 2002.

Legislative duties

a. The purpose of a Health and Safety Policy.
b. The relevance of the Health and Safety Executive.
c. The relevance of an initial induction to Health and Safety requirements at your workplace.
d. General employee responsibilities under the HASAWA and the consequences of non-compliance.
e. General employer responsibilities under the HASAWA and the consequences of non-compliance.
f. The limits of authority with regard to Heath and Safety within a personal job role.
g. Workplace procedure to be followed to report Health and Safety matters.

Precautions to be taken when working with vehicles, workshop materials, tools and equipment including electrical safety, pneumatics and hydraulics

a. Accessing and interpreting safety information.
b. Seeking advice when needed.
c. Seeking assistance when required.
d. Reporting of unsafe equipment.
e. Storing tools, equipment and products safely and appropriately.
f. Using the correct PPE.
g. Following manufacturers' recommendations.
h. Following application procedures e.g. hazardous substances.
i. The correct selection and use of extraction equipment.

PPE to include:

a. Typical maintenance procedures for PPE equipment to include:
    i. typical maintenance log
    ii. cleaning procedures
    iii. filter maintenance
    iv. variation in glove types
    v. air quality checks.
b. Choice and fitting procedures for masks and air breathing equipment.
c. Typical workplace processes which would require the use of PPE to include:
    i. welding
    ii. sanding and grinding
    iii. filling
    iv. panel removal and replacement
    v. drilling
    vi. cutting
    vii. chiselling
    viii. removal of broken glass
    ix. removal of rubber seals from fire damaged vehicles
    x. removal of hypodermic needles
    xi. servicing activities
    xii. roadside recovery.
d. Unserviceable PPE.

e. PPE required for a range automotive repair activities. To include appropriate protection of:
    i. eyes
    ii. ears
    iii. head
    iv. skin
    v. feet
    vi. hands
    vii. lungs.

Fire and extinguishers

a. Classification of fire types.
b. Using a fire extinguisher effectively.
c. Types of extinguishers:
    i. foam
    ii. dry powder
    iii. CO2
    iv. water
    v. fire blanket.

Action to be taken in the event of a fire to include:

a. The procedure as:
    i. raise the alarm
    ii. fight fire only if appropriate
    iii. evacuate building
    iv. call for assistance.

Product warning labels to include:

a. Reasons for placing warning labels on containers.
b. Warning labels in common use
    i. toxic
    ii. corrosive
    iii. poisonous
    iv. harmful
    v. irritant
    vi. flammable
    vii. explosive.

Warning signs and notices

a. Colours used for warning signs:
    i. red
    ii. blue
    iii. green.
b. Shapes and meaning of warning signs:
    i. round
    ii. triangular
    iii. square.
c. The meaning of prohibitive warning signs in common use.
d. The meaning of mandatory warning signs in common use.
e. The meaning of warning notices in common use.
f. General design of safe place warning signs.

Hazards and risks to include:

a. The difference between a risk and a hazard.
b. Potential risks resulting from:
    i. the use and maintenance of machinery or equipment
    ii. the use of materials or substances
    iii. accidental breakages and spillages
    iv. unsafe behaviour
    v. working practices that do not conform to laid down policies
    vi. environmental factors
    vii. personal presentation
    viii. unauthorised personnel, customers, contractors etc entering the work premises
    ix. working by the roadside
    x. vehicle recovery.
c. The employee's responsibilities in identifying and reporting risks within their working environment.
d. The method of reporting risks that is outside own limits of authority.
e. Potential causes of:
    i. fire
    ii. explosion
    iii. noise
    iv. harmful fumes
    v. slips
    vi. trips
    vii. falling objects
    viii. accidents whilst dealing with broken down vehicles.

Personal responsibilities

a. The purpose of workplace polices and procedures on:
    i. the use of safe working methods and equipment
    ii. the safe use of hazardous substances
    iii. smoking, eating , drinking and drugs
    iv. emergency procedures
    v. personal appearance.
b. The importance of personal appearance in the control of health and safety.

Action to be taken in the event of colleagues suffering accidents

a. The typical sequence of events following the discovery of an accident such as:
    i. make the area safe
    ii. remove hazards if appropriate i.e. switch off power
    iii. administer minor first aid
    iv. take appropriate action to re-assure the injured party
    v. raise the alarm
    vi. get help
    vii. report on the accident.
b. Typical examples of first aid which can be administered by persons at the scene of an accident:
    i. check for consciousness
    ii. stem bleeding

iii. keep the injured person's airways free
iv. place in the recovery position if injured person is unconscious
v. issue plasters for minor cuts
vi. action to prevent shock i.e. keep the injured party warm
vii. administer water for minor burns or chemical injuries
viii. wash eyes with water to remove dust or ingress of chemicals (battery acid)
ix. need to seek professional help for serious injuries.

c. Examples of bad practice which may result in further injury such as:
i. moving the injured party
ii. removing foreign objects from wounds or eyes
iii. inducing vomiting
iv. straightening deformed limbs.

Unit 053 Knowledge of support for job roles in the automotive work environment

UAN:	**T/601/6175**
Level:	3
Credit value:	3
GLH:	20
Relationship to NOS:	This unit is linked to G3 Maintain Working Relationships in the Motor Vehicle Environment.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit enables the learner to develop an understanding of how to keep good working relationships with all colleagues in the automotive work environment by using effective communication and support skills.

Learning outcome	**The learner will:**
1 understand key organisational structures, functions and roles within the automotive work environment	
Assessment criteria	
The learner can: 1.1 identify the purpose of the different sections of a typical automotive work environment 1.2 explain organisational structures and lines of communication within the automotive work environment 1.3 explain levels of responsibility within specific job roles in an automotive workplace. To include: a. trainee b. skilled technician c. supervisor d. manager.	

Learning outcome	**The learner will:**
2 understand the importance of obtaining, interpreting and using information in order to support their job role within the automotive work environment	

Assessment criteria
The learner can: 2.1 explain the importance of different sources of information in an automotive work environment 2.2 explain how to find, interpret and use relevant sources of information 2.3 describe the main legal requirements relating to the vehicle, including road safety requirements 2.4 explain the importance of working to recognised procedures and processes 2.5 explain when replacement units and components must meet the manufacturers' original equipment specification 2.6 explain the purpose of how to use identification codes.

Learning outcome	The learner will:
3 understand the importance of different types of communication within the automotive work environment	
Assessment criteria	
The learner can: 3.1 explain where different methods of communication would be used within the automotive environment 3.2 explain the factors which can determine their choice of communication 3.3 explain how the communication of information can change with the target audience to include informed and uninformed people.	

Learning outcome	The learner will:
4 understand communication requirements when carrying out vehicle repairs in the automotive work environment	
Assessment criteria	
The learner can: 4.1 explain how to report using written and verbal communication 4.2 explain the importance of documenting information relating to work carried out in the automotive environment 4.3 explain the importance of working to agreed timescales.	

Learning outcome	The learner will:
5 understand how to develop good working relationships with colleagues and customers in the automotive workplace	
Assessment criteria	
The learner can: 5.1 describe how to develop positive working relationships with colleagues and customers 5.2 explain the importance of developing positive working relationships 5.3 explain the importance of accepting other peoples' views and opinions 5.4 explain the importance of making and honouring realistic commitments to colleagues and customers.	

Unit 053 Knowledge of support for job roles in the automotive work environment

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

The structure of a typical vehicle repair business

a. How these areas relate to each other within the business:

i. body shop
ii. vehicle repair workshop
iii. paint shop
iv. valeting
v. vehicle parts store
vi. main office
vii. vehicle sales
viii. reception.

Sources of information:

a. other staff
b. manuals
c. parts lists
d. computer software and the internet
e. manufacturer
f. diagnostic equipment.

Communication requirements when carrying out vehicle repairs

a. Locating and using correct documentation and information for:

i. recording vehicle maintenance and repairs
ii. vehicle specifications
iii. component specifications
iv. oil and fluid specifications
v. equipment and tools
vi. identification codes.

b. Procedures for:

i. referral of problems
ii. reporting delays
iii. additional work identified during repair or maintenance
iv. keeping others informed of progress.

c. Methods of communication:

i. verbal
ii. signs and notices
iii. memos
iv. telephone

v. electronic mail
vi. vehicle job card
vii. notice boards
viii. SMS text messaging
ix. letters.

d. Organisational and customer requirements:

i. importance of time scales to customer and organization
ii. relationship between time and costs
iii. meaning of profit.

e. Choice of communication

i. distance
ii. location
iii. job responsibility.

f. Importance of maintaining positive working relationships:

i. morale
ii. productivity
iii. company image
iv. customer relationships
v. colleagues.

Unit 054 Knowledge of materials, fabrication, tools and measuring devices in the automotive environment

UAN:	**K/601/6237**
Level:	2
Credit value:	4
GLH:	40
Relationship to NOS:	This unit is linked to G4 Use of hand tools and equipment in Motor Vehicle Engineering.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit enables the learner to develop an understanding of: • the correct selection, care and use of key hand tools and measuring devices for modification, fabrication and repair in the automotive environment • the correct preparation and use of common work environment equipment • the correct selection and fabrication of materials used when modifying and repairing • the correct application of automotive engineering fabrication and fitting principles.

Learning outcome	**The learner will:**
1	understand how to select, use and care for hand tools and measuring devices in the automotive environment
Assessment criteria	
The learner can:	
1.1	identify and explain the use of common types of hand tools used for fabricating and fitting in the automotive environment
1.2	identify and explain the use of common measuring devices used for fabrication and fitting in the automotive environment
1.3	describe, within the scope of their responsibilities, how to select, prepare and maintain hand tools, measuring devices and PPE used for fabrication, repair and fitting in the automotive environment
1.4	state the limitations of common hand tools and measuring devices

used for fabricating, repair and fitting in the automotive workplace 1.5 explain how common hand tools and measuring devices used for fabricating, repair and fitting in the automotive environment should be stored and maintained 1.6 identify common electrical measuring tools used in the repair of vehicles and components 1.7 explain the preparation and safe and correct use of common electrical tools when measuring voltage, current and resistance.

Learning outcome	**The learner will:**
2 understand how to prepare and use common workshop equipment	
Assessment criteria	
The learner can: 2.1 describe the preparation and safe use of workshop equipment 2.2 explain the term: safe working load.	

Learning outcome	**The learner will:**
3 understand how to select materials when fabricating, modifying and repairing vehicles and fitting components	
Assessment criteria	
The learner can: 3.1 describe the properties, application and limitations of ferrous and non-ferrous metals, including their safe use 3.2 describe the properties, application and limitations of common non-metallic materials, including their safe use 3.3 define common terms relating to the properties of materials	

Learning outcome	**The learner will:**
4 understand how to apply automotive engineering, fabrication and fitting principles when modifying and repairing vehicles and components	
Assessment criteria	
The learner can: 4.1 describe how to tap threads, file, cut and drill plastics and metals when modifying or repairing vehicles 4.2 describe how to measure, mark out, shape and join materials when fabricating 4.3 describe the selection and fitting procedures of the following: a. gaskets and seals b. sealants and adhesives c. fittings and fasteners d. electrical circuit components 4.4 identify locking, fastening and fixing devices 4.5 state the importance of current operating specifications for limits, fits and tolerances in the automotive environment.	

Unit 054 Knowledge of materials, fabrication, tools and measuring devices in the automotive environment

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Common types of hand tools used for fabricating and fitting in the automotive workplace to include:

a. files
b. hacksaws and snips
c. hammers
d. screwdrivers
e. pliers
f. spanners
g. sockets
h. punches
i. types of drill and drill bits
j. taps and dies
k. stud removers
l. marking out tools.

Common measuring devices used for fabrication and fitting in the automotive environment. To include:

a. rule or tape
b. callipers
c. feeler gauge
d. volume measures
e. micrometer
f. dial gauges
g. torque wrenches
h. depth gauges

Common electrical measuring tools used in the repair of vehicles and components. To include:

a. ammeter
b. voltmeter
c. ohmmeter
d. multi-meter.

Common electrical terms when measuring:

a. voltage
b. current
c. resistance.

Workshop equipment (including appropriate PPE) to include:
a. hydraulic jacks
b. axle stands
c. pillar drills
d. air tools
e. vehicle lifts
f. cranes
g. hoists
h. electrical power tools.

The properties, application and limitations to include safe use of ferrous and non-ferrous metals used when constructing, modifying and repairing vehicles and components.
Materials to include:
a. carbon steels
b. alloy steels
c. cast iron
d. aluminium alloys
e. brass
f. copper
g. lead.

Properties, application and limitations (to include safe use) of non-metallic materials used when constructing, modifying and repairing vehicles and components. Materials to include:
a. glass
b. plastics (inc. GRP)
c. Kevlar
d. rubber.

Terms relating to the properties of materials to include:
a. hardness
b. toughness
c. ductility
d. elasticity
e. tenacity
f. malleability
g. plasticity.

Unit 058 Knowledge of how to identify and agree motor vehicle customer service needs

UAN:	**R/601/6247**
Level:	3
Credit value:	5
GLH:	45
Relationship to NOS:	This unit is linked to G8 Identify and Agree the Motor Vehicle Customer Needs.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit enables the learner to develop an understanding of how to gain: information from customers on their perceived needs; give advice and information and agree a course of action; contract for the agreed work and complete all necessary records and instructions.

Learning outcome	**The learner will:**
1. understand legislative and organisational requirements and procedures	
Assessment criteria	
The learner can: 1.1 describe the fundamental legal requirements of current consumer legislation and the consequences of their own actions in respect of this legislation 1.2 describe the content and limitations of company and product warranties for the vehicles dealt with by their company 1.3 explain the limits of their own authority for accepting vehicles 1.4 explain the importance of keeping customers informed of progress 1.5 describe their workplace requirements for the completion of records 1.6 explain how to complete and process all the necessary documentation.	

Learning outcome	The learner will:
2. understand how to communicate and care for customers	
Assessment criteria	
The learner can: 2.1 explain how to communicate effectively with customers 2.2 describe how to adapt their language when explaining technical matters to non-technical customers 2.3 explain how to use effective questioning techniques 2.4 describe how to care for customers and achieve customer satisfaction.	

Learning outcome	The learner will:
3. understand company products and services	
Assessment criteria	
The learner can: 3.1 describe the range of options available to resolve vehicle problems 3.2 describe the range and type of services offered by their company 3.3 explain the effect of resource availability upon the receipt of customer vehicles and the completion work 3.4 explain how to access costing and work completion time information.	

Unit 058 Knowledge of how to identify and agree motor vehicle customer service needs

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Organisational requirements

a. Explain the organisation's terms and conditions applicable to the acceptance of customer vehicles.
b. Explain the content and limitations of vehicle and component warranties for the vehicles dealt with by your organisation.
c. Detail what, if any, limits there are to the authority for accepting vehicles.
d. Detail why it is important to keep customers advised of progress and how this is achieved within the organisation.
e. Detail the organisation's procedures for the completion and processing of documentation and records, including payment methods and obtaining customer signatures as applicable.

Principles of customer communication and care

a. First Impressions.
b. Listening skills – 80:20 ratio.
c. Eye contact and smiling.
d. Showing interest and concern.
e. Questioning techniques and customer qualification.
f. Giving clear non-technical explanations.
g. Confirming understanding (statement/question technique, reflective summary).
h. Written communication – purpose, content, presentation and style.
i. Providing a high quality service – fulfilling (ideally exceeding) customer expectations within agreed time frames.
j. Obtaining customer feedback and corrective actions when dissatisfaction expressed.
k. Dealing with complaints.

Company products and services

a. Service standards
    i. national
    ii. manufacturer
    iii. organisational.
b. The range and type of services offered by the organisation.
    i. diagnostic
    ii. servicing

iii. repair
iv. warranty
v. MOT testing
vi. fitment of accessories/enhancements
vii. internal.

c. The courses of action available to resolve customer problems:
    i. the extent and nature of the work to be undertaken
    ii. the terms and conditions of acceptance
    iii. the cost
    iv. the timescale
    v. required payment methods.
d. The effect of resource availability upon the receipt of customer vehicles and the completion of work:
    i. levels and availability of equipment
    ii. levels and availability of technicians
    iii. workshop loading systems.
e. How to access costing and work completion time information:
    i. manuals
    ii. computer based.

Vehicle information systems, servicing and repair requirements

a. Accessing technical data including diagnostics.
b. Servicing to manufacturer requirements/standards.
c. Repair/operating procedures.
d. MOT standards/requirements.
e. Quality controls – interim and final.
f. Requirements for cleanliness of vehicle on return to customer.
g. Handover procedures.

Consumer legislation to include:

a. consumer protection
b. sale of goods
c. data protection
d. product liability
e. health and safety
f. discrimination.

Unit 101 Skills in routine light vehicle maintenance

UAN:	**H/601/3871**
Level:	2
Credit value:	2
GLH:	20
Relationship to NOS:	This unit is linked to LV01 Carry Out Routine Light Vehicle Maintenance.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit allows the learner to develop skills they can carry out light vehicle routine maintenance, adjustments and replacement activities as part of the periodic servicing of vehicles.

Learning outcome	**The learner will:**
1 be able to work safely when carrying out light vehicle routine maintenance	
Assessment criteria	
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all light vehicle routine maintenance activities 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.	

Learning outcome	**The learner will:**
2 be able to use relevant information to carry out the task	
Assessment criteria	
The learner can: 2.1 select suitable sources of technical information to support light vehicle routine maintenance activities including: a. vehicle technical data b. maintenance procedures c. legal requirements 2.2 use technical information to support light vehicle inspection activities	

Learning outcome	The learner will:
3 be able to use appropriate tools and equipment	
Assessment criteria	
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out routine maintenance 3.2 ensure that equipment has been calibrated to meet manufacturers' and legal requirements 3.3 use the correct tools and equipment in the way specified by manufacturers when carrying out routine maintenance	

Learning outcome	The learner will:
4 be able to carry out light vehicle routine maintenance	
Assessment criteria	
The learner can: 4.1 carry out light vehicle maintenance using prescribed methods, adhering to the correct specifications and tolerances for the vehicle and following: a. the manufacturer's approved inspection methods b. recognised researched inspection methods c. health and safety requirements 4.2 carry out adjustments, replacement of vehicle components and replenishment of consumable materials following the manufacturer's current specification 4.3 ensure the examination methods identify accurately any vehicle system and or component problems falling outside the maintenance schedule are specified. 4.4 ensure any comparison of the vehicle against specification accurately identifies any: a. differences from the vehicle specification b. vehicle appearance and condition faults c. variation from legal requirements 4.5 use suitable testing methods to evaluate the performance of all replaced and adjusted components and systems accurately.	

Learning outcome	The learner will:
5 be able to record information and make suitable recommendations	
Assessment criteria	
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 101 Skills in routine light vehicle maintenance

Assessment requirements

The assessment requirements are shown in full in the assessment documentation.

Unit 102 Skills in removing and replacing light vehicle engine units and components

UAN:	**K/601/3872**
Level:	2
Credit value:	5
GLH:	45
Relationship to NOS:	This unit is linked to LV02 Skills in removing and replacing light vehicle engine units and components
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit allows the learner to demonstrate they can remove and replace light vehicle engine system components. It also covers the evaluation of performance of the replaced units and systems.

Learning outcome	**The learner will:**
1 be able to work safely when carrying out removal and replacement activities	
Assessment criteria	
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all light vehicle engine unit and component removal and replacement activities 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.	

Learning outcome	**The learner will:**
2 be able to use relevant information to carry out the task	
Assessment criteria	
The learner can: 2.1 select suitable sources of technical information to support light vehicle engine unit and component removal and replacement activities including: a. vehicle technical data b. removal and replacement procedures c. legal requirements	

2.2	use technical information to support light vehicle engine unit and component removal and replacement activities

Learning outcome	**The learner will:**
3 be able to use appropriate tools and equipment	
Assessment criteria	
The learner can: 3.1 select the appropriate tools and equipment necessary for removal and replacement of light vehicle engine systems 3.2 ensure that equipment has been calibrated to meet manufacturers' and legal requirements 3.3 use the correct tools and equipment in the way specified by manufacturers to remove and replace light vehicle engine systems	

Learning outcome	**The learner will:**
4 be able to carry out removal and replacement of light vehicle engine mechanical, lubrication and cooling units and components	
Assessment criteria	
The learner can: 4.1 remove and replace the light vehicle's engine systems and components, adhering to the correct specifications and tolerances for the vehicle and following: a. the manufacturer's approved removal and replacement methods b. recognised researched repair methods c. health and safety requirements. 4.2 ensure that replaced light vehicle engine units and components conform to the vehicle operating specification and any legal requirements 4.3 use suitable testing methods to evaluate the performance of the reassembled system 4.4 ensure that the reassembled light vehicle engine systems perform to the vehicle operating specification and meet any legal requirements.	

Learning outcome	**The learner will:**
5 be able to record information and make suitable recommendations	
Assessment criteria	
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 102 Skills in removing and replacing light vehicle engine units and components

Assessment requirements

The assessment requirements are shown in full in the assessment documentation.

Unit 103 Skills in removing and replacing light vehicle electrical units and components

UAN:	**T/601/3874**
Level:	2
Credit value:	5
GLH:	45
Relationship to NOS:	This unit is linked to LV03 Remove and Replace Light Vehicle Electrical Units and Components.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit allows the learner to develop skills to remove and replace light vehicle electrical units and components. It also covers the evaluation of performance of the replaced units and systems.

Learning outcome	**The learner will:**
1 be able to work safely when carrying out removal and replacement activities	
Assessment criteria	
The learner can 1.1 use suitable personal protective equipment and vehicle coverings when working on light vehicle electrical systems and components 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment	

Learning outcome	**The learner will:**
2 be able to use relevant information to carry out the task	
Assessment criteria	
The learner can 2.1 select suitable sources of technical information to support light vehicle electrical unit and component removal and replacement activities including: a. vehicle technical data b. removal and replacement procedures c. legal requirements	

2.2	use technical information to support light vehicle electrical unit and component removal and replacement activities.

Learning outcome	**The learner will:**
3 be able to use appropriate tools and equipment	
Assessment criteria	
The learner can 3.1 select the appropriate tools and equipment necessary for removal and replacement of motor vehicle electrical system components 3.2 ensure that equipment has been calibrated to meet manufacturers' and legal requirements 3.3 use the tools and equipment in the way specified by manufacturers to remove and replace motor vehicle electrical systems.	

Learning outcome	**The learner will:**
4 be able to carry out removal and replacement of light vehicle electrical units and components.	
Assessment criteria	
The learner can 4.1 remove and replace the motor vehicle's electrical systems and components, adhering to the specifications and tolerances for the vehicle and following: a. the manufacturer's approved removal and replacement methods b. recognised researched repair methods c. health and safety requirements 4.2 ensure that replacement motor vehicle electrical units and components conform to the vehicle operating specification and any legal requirements 4.3 use suitable testing methods to evaluate the performance of the reassembled system 4.4 ensure that the reassembled motor vehicle electrical systems perform to the vehicle operating specification and meet any legal requirements.	

Learning outcome	**The learner will:**
5 be able to record information and make suitable recommendations	
Assessment criteria	
The learner can 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 103 Skills in removing and replacing light vehicle electrical units and components

Assessment requirements

The assessment requirements are shown in full in the assessment documentation.

Unit 104 Skills in removing and replacing light vehicle chassis units and components

UAN:	**F/601/3876**
Level:	2
Credit value:	5
GLH:	45
Relationship to NOS:	This unit is linked to LV04 Remove and Replace Light Vehicle Chassis Units and Components.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit allows the learner to develop skills to remove and replace light vehicle steering, suspension and braking units (including wheels and tyres). It also covers the evaluation of performance of the replaced units and systems.

Learning outcome	**The learner will:**
1 be able to work safely when carrying out removal and replacement activities	
Assessment criteria	
The learner can 1.1 use suitable personal protective equipment and vehicle coverings throughout all light vehicle chassis unit and component removal and replacement activities 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.	

Learning outcome	**The learner will:**
2 be able to use relevant information to carry out the task	
Assessment criteria	
The learner can 2.1 select suitable sources of technical information to support light vehicle chassis unit and component removal and replacement activities including: a. vehicle technical data b. removal and replacement procedures	

c. legal requirements 2.2 use technical information to support light vehicle chassis unit and component removal and replacement activities.

Learning outcome	The learner will:
3 be able to use appropriate tools and equipment	
Assessment criteria	
The learner can 3.1 select the appropriate tools and equipment necessary for removal and replacement of light vehicle chassis systems including: a. steering b. suspension c. braking d. wheels and tyres 3.2 ensure that equipment has been calibrated to meet manufacturers' and legal requirements 3.3 use the correct tools and equipment in the way specified by manufacturers to remove and replace light vehicle chassis systems.	

Learning outcome	The learner will:
4 be able to carry out removal and replacement of light vehicle chassis units and components	
Assessment criteria	
The learner can 4.1 remove and replace the light vehicle's chassis systems and components, adhering to the correct specifications and tolerances for the vehicle and following: a. the manufacturer's approved removal and replacement methods b. recognised researched repair methods c. health and safety requirements. 4.2 ensure that replacement light vehicle chassis units and components conform to the vehicle operating specification and any legal requirements 4.3 use suitable testing methods to evaluate the performance of the reassembled system 4.4 ensure that the reassembled light vehicle chassis system performs to the vehicle operating specification and meets any legal requirements.	

Learning outcome	The learner will:
5 be able to record information and make suitable recommendations	
Assessment criteria	
The learner can 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 104 Skills in removing and replacing light vehicle chassis units and components

Assessment requirements

The assessment requirements are shown in full in the assessment documentation.

Unit 105 Skills in inspecting light vehicles using prescribed methods

UAN:	**A/601/3889**
Level:	2
Credit value:	4
GLH:	40
Relationship to NOS:	This unit is linked to LV05 Inspect Light Vehicles using Prescribed Inspection Methods and LV06 Inspect Light Vehicles.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit allows the learner to develop skills to carry out a range of light vehicle inspections on vehicles using a variety of prescribed testing and inspection methods.

Learning outcome	**The learner will:**
1 be able to work safely when carrying out light vehicle inspections using prescribed methods	
Assessment criteria	
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings throughout all light vehicle inspection activities 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.	

Learning outcome	**The learner will:**
2 be able to use relevant information to carry out the task	
Assessment criteria	
The learner can: 2.1 select suitable sources of technical information to support light vehicle inspection activities including: a. vehicle technical data b. inspection procedures c. legal requirements 2.2 use technical information to support light vehicle inspection activities.	

Learning outcome	The learner will:
3 be able to use appropriate tools and equipment	
Assessment criteria	
The learner can: 3.1 select the appropriate tools and equipment necessary for carrying out a range of inspections on light vehicle systems 3.2 ensure that equipment has been calibrated to meet manufacturers' and legal requirements 3.3 use the correct tools and equipment in the way specified by manufacturers when carrying out a range of inspections on light vehicle systems.	

Learning outcome	The learner will:
4 be able to carry out light vehicle inspections using prescribed methods	
Assessment criteria	
The learner can: 4.1 carry out light vehicle inspections using prescribed methods, adhering to the correct specifications and tolerances for the vehicle and following: a. the manufacturer's approved inspection methods b. recognised researched inspection methods c. health and safety requirements 4.2 ensure that inspected light vehicle conforms to the vehicle operating specification and any legal requirements 4.3 ensure any comparison of the vehicle against specification accurately identifies any: a differences from the vehicle specification b vehicle appearance and condition faults 4.4 use suitable testing methods to evaluate the performance of the inspected systems.	

Learning outcome	The learner will:
5 be able to record information and make suitable recommendations	
Assessment criteria	
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 105 Skills in inspecting light vehicles using prescribed methods

Assessment requirements

The assessment requirements are shown in full in the assessment documentation.

Unit 111 Skills in overhauling light vehicle engine mechanical units

UAN:	**L/601/3881**
Level:	3
Credit value:	2
GLH:	20
Relationship to NOS:	This unit is linked to LV11 Overhaul Light Vehicle Mechanical Units.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit allows the learner to demonstrate skills in overhauling engines. It also covers the evaluation of performance of the overhauled units and systems.

Learning outcome	**The learner will:**
1 be able to work safely when overhauling light vehicle engine mechanical units	
Assessment criteria	
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings when overhauling light vehicle engine units 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.	

Learning outcome	**The learner will:**
2 be able to use relevant information to carry out the task	
Assessment criteria	
The learner can: 2.1 select suitable sources of technical information to support the overhauling of light vehicle engine units including: a. vehicle technical data b. overhauling procedures c. legal requirements 2.2 use technical information to support the overhauling of light vehicle engine units.	

Learning outcome	The learner will:
3 be able to use appropriate tools and equipment	
Assessment criteria	
The learner can: 3.1 select the appropriate tools and equipment necessary for overhauling light vehicle engine units 3.2 ensure that equipment has been calibrated to meet manufacturers' and legal requirements 3.3 use the tools and equipment in the way specified by manufacturers to overhaul light vehicle engine units.	

Learning outcome	The learner will:
4 be able to carry out the overhauling of light vehicle engine mechanical units	
Assessment criteria	
The learner can: 4.1 carry out all overhauling of light vehicle engine mechanical units, adhering to the specifications and tolerances for the vehicle and following: a. the manufacturer's approved overhauling methods b. recognised researched repair methods c. health and safety requirements. 4.2 ensure the assessment of the dismantled unit identifies accurately its condition and suitability for overhaul 4.3 inform the relevant person(s) promptly where an overhaul is uneconomic or unsatisfactory to perform 4.4 use testing methods that comply with the manufacturer's requirements 4.5 adjust the unit's components correctly where necessary to ensure that they operate to meet the vehicle operating requirements. 4.6 ensure the overhauled units and assemblies conform to the vehicle operating specification and any legal requirements.	

Learning outcome	The learner will:
5 be able to record information and make suitable recommendations	
Assessment criteria	
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 111 Skills in overhauling light vehicle engine mechanical units

Assessment requirements

The assessment requirements are shown in full in the assessment documentation.

Unit 112 Skills in removing and replacing light vehicle driveline units and components

UAN:	**K/601/3886**
Level:	2
Credit value:	5
GLH:	45
Relationship to NOS:	This unit is linked to LV12 Remove and Replace Light Vehicle Driveline Units and Components.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit allows the learner to develop skills in removing and replacing light vehicle transmission and driveline units. It also covers the evaluation of performance of the replaced units and systems.

Learning outcome	**The learner will:**
1 be able to work safely when carrying out removal and replacement activities	
Assessment criteria	
The learner can 1.1 use suitable personal protective equipment and vehicle coverings throughout all light vehicle transmission and driveline unit and component removal and replacement activities 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.	

Learning outcome	**The learner will:**
2 be able to use relevant information to carry out the task	
Assessment criteria	
The learner can 2.1 select suitable sources of technical information to support light vehicle transmission and driveline unit and component removal and replacement activities including: a. vehicle technical data b. removal and replacement procedures	

c. legal requirements 2.2 use technical information to support light vehicle transmission and driveline unit and component removal and replacement activities.

Learning outcome	The learner will:
3 be able to use appropriate tools and equipment	
Assessment criteria	
The learner can 3.1 select the appropriate tools and equipment necessary for removal and replacement of light vehicle transmission and driveline systems 3.2 ensure that equipment has been calibrated to meet manufacturers' and legal requirements 3.3 use the correct tools and equipment in the way specified by manufacturers to remove and replace light vehicle transmission and driveline systems.	

Learning outcome	The learner will:
4 be able to carry out removal and replacement of light vehicle transmission and driveline units and components	
Assessment criteria	
The learner can 4.1 remove and replace the light vehicle's transmission and driveline systems and components, adhering to the correct specifications and tolerances for the vehicle and following: a. the manufacturer's approved removal and replacement methods b. recognised researched repair methods c. health and safety requirements 4.2. ensure that replacement light vehicle transmission and driveline units and components conform to the vehicle operating specification and any legal requirements 4.3. use suitable testing methods to evaluate the performance of the reassembled system 4.4. ensure that the reassembled light vehicle transmission and driveline system performs to the vehicle operating specification and meets any legal requirements.	

Learning outcome	The learner will:
5 be able to record information and make suitable recommendations	
Assessment criteria	
The learner can 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 112 Skills in removing and replacing light vehicle driveline units and components

Assessment requirements

The assessment requirements are shown in full in the assessment documentation.

Unit 121 Skills in overhauling light vehicle transmission units

UAN:	**D/601/3884**
Level:	3
Credit value:	2
GLH:	20
Relationship to NOS:	This unit is linked to LV11 Overhaul Light Vehicle Mechanical Units.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit allows the learner to demonstrate skills in overhauling gearboxes and final drive assemblies. It also covers the evaluation of performance of the overhauled units and systems.

Learning outcome	**The learner will:**
1 be able to work safely when overhauling light vehicle transmission units	
Assessment criteria	
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings when overhauling light vehicle transmission units 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.	

Learning outcome	**The learner will:**
2 be able to use relevant information to carry out the task	
Assessment criteria	
The learner can: 2.1 select suitable sources of technical information to support the overhauling of light vehicle transmission units including: a. vehicle technical data b. overhauling procedures c. legal requirements 2.2 use technical information to support the overhauling of light vehicle transmission units.	

Learning outcome	The learner will:
3 be able to use appropriate tools and equipment	
Assessment criteria	
The learner can: 3.1 select the appropriate tools and equipment necessary for overhaul of light vehicle transmission systems 3.2 ensure that equipment has been calibrated to meet manufacturers' and legal requirements 3.3 use the tools and equipment in the way specified by manufacturers to overhaul light vehicle transmission units.	

Learning outcome	The learner will:
4 be able to carry out the overhauling of light vehicle transmission units	
Assessment criteria	
The learner can: 4.1 carry out all overhauling of light vehicle transmission units, adhering to the specifications and tolerances for the vehicle and following: a. the manufacturer's approved overhauling methods b. recognised researched repair methods c. health and safety requirements 4.2 ensure the assessment of the dismantled unit identifies accurately its condition and suitability for overhaul 4.3 inform the relevant person(s) promptly where an overhaul is uneconomic or unsatisfactory to perform 4.4 use testing methods that comply with the manufacturer's requirements 4.5 adjust the unit's components correctly where necessary to ensure that they operate to meet the vehicle operating requirements 4.6 ensure the overhauled units and assemblies conform to the vehicle operating specification and any legal requirements.	

Learning outcome	The learner will:
5 be able to record information and make suitable recommendations	
Assessment criteria	
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 121 Skills in overhauling light vehicle transmission units

Assessment requirements

The assessment requirements are shown in full in the assessment documentation.

Unit 131 Skills in overhauling light vehicle steering and suspension units

UAN:	**H/601/3885**
Level:	3
Credit value:	2
GLH:	20
Relationship to NOS:	This unit is linked to LV11 Overhaul Light Vehicle Mechanical Units.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit allows the learner to demonstrate skills in overhauling steering and suspension units. It also covers the evaluation of performance of the overhauled units and systems.

Learning outcome	**The learner will:**
1 be able to work safely when overhauling light vehicle steering and suspension units	
Assessment criteria	
The learner can: 1.1 use suitable personal protective equipment and vehicle coverings when overhauling light vehicle steering and suspension units 1.2 work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.	

Learning outcome	**The learner will:**
2 be able to use relevant information to carry out the task	
Assessment criteria	
The learner can: 2.1 select suitable sources of technical information to support the overhauling of light vehicle steering and suspension units including: a. vehicle technical data b. overhauling procedures c. legal requirements 2.2 use technical information to support the overhauling of light vehicle steering and suspension units.	

Learning outcome	The learner will:
3 be able to use appropriate tools and equipment	
Assessment criteria	
The learner can: 3.1 select the appropriate tools and equipment necessary for overhauling light vehicle steering and suspension units 3.2 ensure that equipment has been calibrated to meet manufacturers' and legal requirements 3.3 use the tools and equipment in the way specified by manufacturers for overhauling light vehicle steering and suspension units.	

Learning outcome	The learner will:
4 be able to carry out the overhauling of light vehicle steering and suspension units	
Assessment criteria	
The learner can: 4.1 carry out all overhauling of light vehicle steering and suspension units, adhering to the specifications and tolerances for the vehicle and following: a. the manufacturer's approved overhauling methods b. recognised researched repair methods c. health and safety requirements. 4.2 ensure the assessment of the dismantled unit identifies accurately its condition and suitability for overhaul 4.3 inform the relevant person(s) promptly where an overhaul is uneconomic or unsatisfactory to perform 4.4 use testing methods that comply with the manufacturer's requirements 4.5 adjust the unit's components correctly where necessary to ensure that they operate to meet the vehicle operating requirements 4.6 ensure the overhauled units and assemblies conform to the vehicle operating specification and any legal requirements.	

Learning outcome	The learner will:
5 be able to record information and make suitable recommendations	
Assessment criteria	
The learner can: 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 131 Skills in overhauling light vehicle steering and suspension units

Assessment requirements

The assessment requirements are shown in full in the assessment documentation.

Unit 151 Knowledge of routine light vehicle maintenance

UAN:	**F/601/3716**
Level:	2
Credit value:	3
GLH:	20
Relationship to NOS:	This unit is linked to LV01 Carry Out Routine Light Vehicle Maintenance.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit enables the learner to develop an understanding of conducting routine maintenance, adjustment and replacement activities as part of the periodic servicing of light vehicles.

Learning outcome	**The learner will:**
1 Understand how to carry out routine light vehicle maintenance	
Assessment criteria	
The learner can: 1.1 explain how to conduct a scheduled light vehicle routine examination and assessment against the vehicle manufacturer's specification 1.2 identify the assessment methods used to check for conformity 1.3 Identify the different systems to be inspected while carrying out light vehicle routine maintenance a. engine b. chassis c. wheels and tyres d. transmission and driveline e. electrical and electronic f. exterior vehicle body g. vehicle interior 1.4 describe the procedures used for checking the condition and serviceability of light vehicle units and components 1.5 describe the procedures for checking and replenishing fluid levels 1.6 describe the procedures for checking and replacing lubricants and fluids 1.7 identify adjustments that need to be carried out on a light vehicle routine maintenance	

1.8	explain the procedure for reporting cosmetic damage to vehicle components and units outside normal service items
1.9	identify the operating specifications for the systems being checked while carrying out light vehicle routine maintenance.

Learning outcome	**The learner will:**
2 Understand the importance of carrying out light vehicle maintenance	
Assessment criteria	
The learner can:	
2.1	describe the requirements of correct maintenance in order to maintain the vehicle in a roadworthy and legal condition
2.2	describe the importance of correct maintenance for warranty purposes.

Unit 151 Knowledge of routine light vehicle maintenance

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

a. Vehicle maintenance, inspection and adjustment and record finding.
b. Vehicle inspection techniques used in routine maintenance including:
    i. aural
    ii. visual and functional assessments on engine
    iii. engine systems
    iv. chassis systems
    v. wheels and tyres
    vi. transmission system
    vii. electrical and electronic systems
    viii. exterior vehicle body
    ix. vehicle interior.
c. The procedures used for inspecting the condition and serviceability of the following:
    i. filters
    ii. drive belts
    iii. wiper blades
    iv. brake linings
    v. pads
    vi. tyres
    vii. lights.
d. Preparation and appropriate use of equipment to include:
    i. test instruments
    ii. emission equipment
    iii. wheel alignment
    iv. beam setting equipment
    v. tyre tread depth gauges.
e. Procedures for checking and replenishing fluid levels:
    i. oil
    ii. water
    iii. hydraulic fluids.
f. Procedures for checking and replacement of lubricants:
    i. replace oil filters
    ii. check levels
    iii. types of oil
    iv. cleanliness
    v. disposal of old oil and filters.
g. Procedures for carrying out adjustments on vehicle systems or components:
    i. clearances
    ii. settings
    iii. alignment
    iv. operational performance (engine idle, exhaust gas).

h. Procedures for checking electrical systems:
    i. operation
    ii. security
    iii. performance.
i. Importance and process of detailed inspection procedures:
    i. following inspection checklists
    ii. checking conformity to manufacturer's specifications
    iii. UK and European legal requirements.
j. Importance and process of completing all relevant documentation relating to routine maintenance:
    i. inspection records
    ii. job cards
    iii. vehicle repair records
    iv. in-vehicle service history.
k. The need to use vehicle protection prior to repair. Requirements and methods used for protecting:
    i. vehicle body panels
    ii. paint surfaces
    iii. seats
    iv. carpets and floor mats.
l. The need to check the vehicle following routine maintenance.
m. The need to inspect the vehicle following routine maintenance:
    i. professional presentation of vehicle
    ii. customer perceptions.
n. The checks of vehicle following routine maintenance:
    i. removal of oil and grease marks
    ii. body panels
    iii. paint surfaces
    iv. seats
    v. carpets and floor mats
    vi. re-instatement of components.

Unit 152 Knowledge of light vehicle engine mechanical, lubrication and cooling system units and components

UAN:	**R/601/3719**
Level:	2
Credit value:	3
GLH:	20
Relationship to NOS:	This unit is linked to LV02 Remove and Replace Light Vehicle Engine Units and Components.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit enables the learner to develop an understanding of conducting routine maintenance, adjustment and replacement activities as part of the periodic servicing of light vehicles.

Learning outcome	**The learner will:**
1 understand how the main light vehicle engine mechanical systems operate	
Assessment criteria	
The learner can 1.1 identify light vehicle engine mechanical system components 1.2 describe the construction and operation of light vehicle engine mechanical systems a. four stroke b. spark ignition c. compression ignition d. rotary 1.2 compare key light vehicle engine mechanical system components and assemblies against alternatives to identify differences in construction and operation 1.3 identify the key engineering principles that are related to light vehicle engine mechanical systems a. compression ratios b. cylinder capacity c. power	

d. torque 1.4 state common terms used in light vehicle engine mechanical system design a. tdc b. bdc c. stroke d. bore.

Learning outcome	**The learner will:**
2 understand how light vehicle engine lubrication systems operate	
Assessment criteria	
The learner can 2.1 identify light vehicle engine lubrication system components 2.2 describe the construction and operation of light vehicle engine lubrication components and systems a. full flow b. by pass c. wet sump d. dry sump 2.3 compare key light vehicle engine lubrication system components and assemblies to identify differences in construction and operation 2.4 identify the key engineering principles that are related to light vehicle engine lubrication systems a. classification of lubricants b. properties of lubricants c. methods of reducing friction 2.5 state common terms used in light vehicle engine lubrication system design.	

Learning outcome	**The learner will:**
3 understand how light vehicle engine cooling, heating and ventilation systems operate	
Assessment criteria	
The learner can 3.1 identify light vehicle engine cooling, heating and ventilation system components 3.2 describe the construction and operation of light vehicle engine cooling, heating and ventilation systems 3.3 compare key light vehicle engine cooling, heating and ventilation system components and assemblies against alternatives to identify differences in construction and operation 3.4 identify the key engineering principles that are related to light vehicle engine cooling, heating and ventilation systems a. heat transfer b. linear and cubical expansion c. specific heat capacity d. boiling point of liquids 3.5 state common terms used in key light vehicle engine cooling, heating and ventilation system design.	

Learning outcome	The learner will:
4 understand how to check, replace and test light vehicle engine mechanical, lubrication and cooling systems system units and components	
Assessment criteria	
The learner can 4.1 describe how to remove and replace engine mechanical, lubrication and cooling system units and components 4.2 describe common types of testing methods used to check the operation of engine mechanical, lubrication and cooling systems and their purpose 4.3 describe how to test and evaluate the performance of replacement units against vehicle specification 4.4 identify common faults found in light vehicle engine mechanical, lubrication and cooling systems and their causes.	

Unit 152 Knowledge of light vehicle engine mechanical, lubrication and cooling system units and components

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Engines

a. Engine types and configurations:
   i. inline
   ii. flat
   iii. vee
   iv. four-stroke cycle and two-stroke cycle for spark ignition and compression ignition engines
   v. naturally aspirated and turbo-charged engines
   vi. hybrid fuel engines.
b. Relative advantages and disadvantages of different engine types and configurations.
c. Engine components and layouts:
   i. single (OHC) and multi camshaft (DOHC)
   ii. single and multi cylinder (2, 4, 6, 8 cylinder types).
d. Cylinder head layout and design, combustion chamber and piston design.
e. Calculate compression ratios from given data.
f. The procedures used when inspecting engines.
g. The procedures to assess:
   i. serviceability
   ii. wear
   iii. condition
   iv. clearances
   v. settings
   vi. linkages
   vii. joints
   viii. fluid systems
   ix. adjustments
   x. operation and functionality
   xi. security.
h. Symptoms and faults associated with mechanical engine operation:
   i. poor performance
   ii. abnormal or excessive mechanical noise
   iii. erratic running

iv. low power
v. exhaust emissions
vi. abnormal exhaust smoke
vii. unable to start
viii. exhaust gas leaks to cooling system
ix. exhaust gas leaks.

Lubrication

a. The advantages and disadvantages of wet and dry systems.
b. Engine lubrication system:
   i. splash and pressurised systems
   ii. pumps
   iii. pressure relief valve
   iv. filters
   v. oil ways
   vi. oil coolers.
c. Terms associated with lubrication and engine oil:
   i. full-flow
   ii. hydrodynamic
   iii. boundary
   iv. viscosity
   v. multi-grade
   vi. natural and synthetic oil
   vii. viscosity index
   viii. multi-grade.
d. The requirements and features of engine oil:
   i. operating temperatures
   ii. pressures
   iii. lubricant grades
   iv. viscosity
   v. multi-grade oil
   vi. additives
   vii. detergents
   viii. dispersants
   ix. anti-oxidants inhibitors
   x. anti-foaming agents
   xi. anti-wear
   xii. synthetic oils
   xiii. organic oils
   xiv. mineral oils.
e. Symptoms and faults associated with lubrication systems:
   i. excessive oil consumption
   ii. oil leaks
   iii. oil in water
   iv. low or excessive pressure
   v. oil contamination.
f. The procedures used when inspecting lubrication system.

Cooling, Heating and Ventilation

a. The components, operating principles, and functions of engine cooling systems.
b. Procedures used to remove, replace and adjust cooling system components:
    i. cooling fans and control devices
    ii. header tanks, radiators and pressure caps
    iii. heater matrices and temperature control systems
    iv. expansion tanks hoses, clips and pipes
    v. thermostats impellers and coolant
    vi. ventilation systems.
c. The preparation and method of use of appropriate specialist equipment used to evaluate system performance following component replacement.
    i. system pressure testers
    ii. pressure cap testers
    iii. hydrometer, or anti-freeze testing equipment
    iv. chemical tests for the detection of combustion gas.
d. The layout and construction of internal heater systems.
e. The controls and connections within internal heater system.
f. Symptoms and faults associated with cooling systems:
    i. water leaks
    ii. water in oil
    iii. internal heating system: efficiency, operation, leaks, controls, air filtration, air leaks and contamination
    iv. excessively low or high coolant temperature.
g. The procedures used when inspecting:
    i. internal heating system
    ii. cooling system.

General

a. The preparation, testing and use of tools and equipment used for:
    i. dismantling
    ii. removal and replacement of engine units and components.
b. Appropriate safety precautions:
    i. PPE
    ii. vehicle protection when dismantling
    iii. removal and replacing engine units and components.
c. The importance of logical and systematic processes.
d. The inspection and testing of engine units and components.
e. The preparation of replacement units for re-fitting or replacement.
f. The reasons why replacement components and units must meet the original specifications (OES) – warranty requirements, to maintain performance and safety requirements.
g. Refitting procedures.
h. The inspection and testing of units and system to ensure compliance with manufacturer's, legal and performance requirements.
i. The inspection and re-instatement of the vehicle following repair to ensure customer satisfaction:
    i. cleanliness of vehicle interior and exterior
    ii. security of components and fittings
    iii. re-instatement of components and fittings.

Unit 153 Knowledge of removing and replacing light vehicle electrical units and components

UAN:	**T/601/3731**
Level:	2
Credit value:	6
GLH:	45
Relationship to NOS:	This unit is linked to LV03 Remove and Replace Light Vehicle Electrical Units and Components.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit enables the learner to develop an understanding of the principles, construction and operation and testing methods of common electrical and electronic systems and components. It also covers the procedures involved in the removal and replacement of system components and the evaluation of their performance.

Learning outcome	**The learner will:**
1 understand light vehicle electrical and electronic principles	
Assessment criteria	
1.1	identify electrical symbols and units found in light vehicle circuits
1.2	describe how to interpret simple light vehicle wiring diagrams
1.3	describe the operation of key light vehicle circuit protection devices and why these are necessary
1.4	describe earthing principles and earthing methods
1.5	identify the use of different cables and connectors used in light vehicle circuits
1.6	describe the operation of electrical and electronic sensors and actuators and their application
1.7	describe the key electrical and electronic control principles that are related to light vehicle electrical circuits
1.8	state common terms used in light vehicle electrical circuits.

Learning outcome	The learner will:
2 understand how light vehicle batteries, starting and charging systems operate	
Assessment criteria	
The learner can 2.1 identify light vehicle batteries, starting and charging system components 2.2 describe the construction and operation of light vehicle batteries, starting and charging system components 2.3 describe how to remove and replace batteries, starting and charging system units and components 2.4 compare light vehicle batteries, starting and charging system components and assemblies against alternatives to identify differences in construction and operation 2.5 state common terms used in conjunction with light vehicle batteries, starting and charging systems.	

Learning outcome	The learner will:
3 understand how light vehicle auxiliary electrical systems operate	
Assessment criteria	
The learner can 3.1 identify light vehicle auxiliary system components 3.2 describe the construction and operation of light vehicle auxiliary systems. Auxiliary systems to include: a. lighting b. wiper c. security and alarm d. comfort and convenience e. information and entertainment f. telephone and two-way communication g. electric window h. monitoring and instrumentation 3.3 compare key light vehicle auxiliary system components and assemblies against alternatives to identify differences in construction and operation 3.4 state common terms used in light vehicle auxiliary system design.	

Learning outcome	The learner will:
4 understand how to check, replace and test light vehicle electrical systems and components	
Assessment criteria	
The learner can 4.1 describe how to remove and replace light vehicle electrical system units and components 4.2 describe common types of testing methods used to check the operation of light vehicle electrical systems and components and their purpose	

4.3	explain how to test and evaluate the performance of replacement units against specifications
4.4	identify common faults found in light vehicle electrical systems and components.

Unit 153 Knowledge of removing and replacing light vehicle electrical units and components

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Electrical/electronic principles

a. Electrical units:
   i. volt (electrical pressure)
   ii. ampere (electrical current)
   iii. ohm (electrical resistance)
   iv. watt (power).
b. The requirements for an electrical circuit:
   i. battery
   ii. cables
   iii. switch
   iv. current consuming device
   v. continuity.
c. The direction of current flow and electron flow.
d. Series and parallel circuits to include:
   i. current flow
   ii. voltage of components
   iii. volt drop
   iv. resistance.
   v. the effect on circuit operation of open circuit component(s).
e. Earth and insulated return systems.
f. Cable sizes and colour codes.
g. Different types of connectors, terminals and circuit protection devices.
h. Common electrical and electronic symbols.
i. The meaning of:
   i. short circuit
   ii. open circuit
   iii. bad earth
   iv. high resistance
   v. electrical capacity.
j. The principles of vehicle electronic systems and components.
k. Interpret vehicle wiring diagrams to include:
   i. vehicle lighting
   ii. auxiliary circuits

iii. indicators
iv. starting and charging systems.

l. Function and construction of electrical components including:
   i. circuit relays
   ii. bulb types
   iii. fan and heater
   iv. circuit protection.

m. The safety precautions when working on electrical and electronic systems to include:
   i. disconnection and connection of battery
   ii. avoidance of short circuits
   iii. power surges
   iv. prevention of electric shock
   v. protection of electrical and electronic components
   vi. protection of circuits from overload or damage.

n. The set-up and use of:
   i. digital and analogue multi-meters
   ii. voltmeter
   iii. ammeter
   iv. ohmmeter
   v. oscilloscope
   vi. manufacturer's dedicated test equipment.

o. Electrical and electronic checks for electrical and electronic systems to include:
   i. connections
   ii. security
   iii. functionality
   iv. performance to specifications
   v. continuity, open circuit
   vi. short circuit
   vii. high resistance
   viii. volt drop
   ix. current consumption
   x. output patterns (oscilloscope).

p. Symptoms and faults associated with electrical and electronic systems to include:
   i. high resistance
   ii. loose and corroded connections
   iii. short circuit
   iv. excessive current consumption
   v. open circuit
   vi. malfunction
   vii. poor performance
   viii. battery faults to include flat battery
   ix. failure to hold charge
   x. low state of charge
   xi. overheating
   xii. poor starting.

Battery and charging

a. The construction and operation of vehicle batteries including:
    i. low maintenance and maintenance free
    ii. lead acid and nickel cadmium types
    iii. cells
    iv. separators
    v. plates
    vi. electrolyte.
b. The operation of the vehicle charging system:
    i. alternator
    ii. rotor
    iii. stator
    iv. slip ring
    v. brush assembly
    vi. three phase output
    vii. diode rectification pack
    viii. voltage regulation
    ix. phased winding connections
    x. cooling fan
    xi. alternator drive system.

Starting

a. The layout, construction and operation of engine starting systems: inertia and pre-engaged principles.
b. The function and operation of the following components:
    i. inertia and pre-engaged starter motor
    ii. starter ring gear
    iii. pinion
    iv. starter solenoid
    v. ignition/starter switch
    vi. starter relay (if appropriate)
    vii. one-way clutch (pre-engaged starter motor).

Lighting

a. Function and construction of electrical components including:
    i. front and tail lamps
    ii. main and dip beam headlamps
    iii. fog and spot lamps
    iv. lighting and dip switch
    v. directional indicators.
b. The circuit diagram and operation of components for:
    i. side and tail lamps
    ii. headlamps
    iii. interior lamps
    iv. fog and spot lamps
    v. direction indicators.
c. The statutory requirements for vehicle lighting when using a vehicle on the road.
d. Headlamp adjustment and beam setting.

Auxiliary systems

a. Function and construction of electrical components including:
    i. central door locking
    ii. anti theft devices
    iii. manual locking and dead lock systems
    iv. window winding
    v. demisting systems
    vi. door mirror operation mechanisms
    vii. interior lights and switching
    viii. sun roof operation.
b. The circuit diagram and operation of components for:
    i. central door locking
    ii. anti theft devices
    iii. manual locking and dead lock systems
    iv. window winding
    v. demisting systems
    vi. door mirror operation mechanisms
    vii. sun roof operation.
c. Comfort and convenience systems to include:
    i. heated seats
    ii. electrically adjusted seats
    iii. heated screens
    iv. electric mirrors
    v. heating
    vi. climate control
    vii. air conditioning.

General

a. The preparation, testing and use of:
    i. tools and equipment
    ii. electrical meters and equipment used for dismantling
    iii. removal and replacement of electrical and electronic systems and components.
b. Appropriate safety precautions:
    i. PPE
    ii. vehicle protection when dismantling
    iii. removal of and replacing electrical and electronic components and systems.
c. The importance of logical and systematic processes.
d. Preparation of replacement units for re-fitting or replacement electrical and electronic components and systems.
e. The reasons why replacement components and units must meet the original specifications (OES) – warranty requirements, to maintain performance, safety requirements.
f. Refitting procedures.
g. The inspection and testing of units and systems to ensure compliance with manufacturer's, legal and performance requirements.
h. Inspection and re-instatement of the vehicle following repair to ensure:
    i. customer satisfaction
    ii. cleanliness of vehicle interior and exterior
    iii. security of components and fittings

iv. re-instatement of components and fittings.

Unit 154 Knowledge in removing and replacing light vehicle chassis units and components

UAN:	**A/601/3732**
Level:	2
Credit value:	6
GLH:	45
Relationship to NOS:	This unit is linked to LV04 Remove and Replace Light Vehicle Chassis Units and Components.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit enables the learner to develop an understanding of the construction and operation of common steering, suspension and braking systems (including wheels and tyres). It also covers the procedures involved in the removal and replacement of system components and the evaluation of their performance.

Learning outcome	**The learner will:**
1 understand how light vehicle steering and suspension systems operate	
Assessment criteria	
The learner can 1.1 identify light vehicle steering and suspension system components 1.2 describe the construction and operation of light vehicle steering and suspension systems 1.3 compare key light vehicle steering and suspension system components and assemblies against alternatives to identify differences in construction and operation 1.4 identify the key engineering principles that are related to light vehicle steering and suspension systems a. steering angles b. hydraulic forces c. stress and strain 1.5 state common terms used in light vehicle steering and suspension system design.	

Learning outcome	The learner will:
2 understand how light vehicle braking systems operate	
Assessment criteria	
The learner can 2.1 identify light vehicle braking system components 2.2 describe the construction and operation of light vehicle braking systems 2.3 compare key light vehicle braking system components and assemblies against alternatives to identify differences in construction and operation 2.4 identify the key engineering principles that are related to light vehicle braking systems a. laws of friction b. hydraulics c. pneumatics d. properties of fluids e. properties of air f. braking efficiency 2.5 state common terms used in light vehicle braking system design.	

Learning outcome	The learner will:
3 understand how light vehicle wheel and tyre systems operate	
Assessment criteria	
The learner can 3.1 identify light vehicle wheel and tyre components 3.2 describe the construction and operation of light vehicle wheels and tyres 3.3 compare key light vehicle wheel and tyre components and assemblies against alternatives to identify differences in construction and operation 3.4 identify the key engineering principles that are related to light vehicle wheel and tyre systems a. friction b. un-sprung weight c. dynamic and static balance 3.5 state common terms used in light vehicle wheel and tyre design.	

Learning outcome	The learner will:
4 understand how to check, replace and test light vehicle chassis units and components	
Assessment criteria	
The learner can 4.1 describe how to remove and replace chassis units and components 4.2 describe common types of testing methods used to check the operation of chassis units and components and their purpose 4.3 explain how to evaluate the performance of replacement units against vehicle specification 4.4 identify common faults found in light vehicle chassis units and components.	

Unit 154 Knowledge of removing and replacing light vehicle chassis units and components

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Steering

a. The action and purpose of steering geometry:
   i. castor angle
   ii. camber angle
   iii. kingpin or swivel pin inclination
   iv. negative offset
   v. wheel alignment (tracking) (toe in and toe out)
   vi. toe out on turns
   vii. steered wheel geometry.
b. The following terms associated with steering:
   i. Ackerman principle
   ii. slip angles
   iii. self-aligning torque oversteer and understeer
   iv. neutral steer.
c. The components and layout of hydraulic power steering systems:
   i. piston and power cylinders
   ii. drive belts and pumps
   iii. hydraulic valve (rotary, spool and flapper type)
   iv. hydraulic fluid.
d. The advantages of power assisted steering.
e. The operation of hydraulic power steering.
f. The principles of electronic power steering systems.
g. The procedures used for inspecting the serviceability and condition of:
   i. manual steering
   ii. power steering.
h. Steering system defects to include:
   i. uneven tyre wear
   ii. wear on outer edge of tyre
   iii. wear on inner edge of tyre
   iv. uneven wear
   v. flats on tread
   vi. steering vibrations
   v. wear in linkage
   vi. damage linkage

vii. incorrect wheel alignment
viii. incorrect steering geometry.

Suspension

a. The layout and components of suspension systems:
    i. non-independent suspensions
    ii. independent front suspension (IFS)
    iii. independent rear suspension (IRS)
    iv. hydraulic
    v. hydro-pneumatic
    vi. rigid axle types.
b. The operation of suspension systems and components:
    i. leaf and coil springs
    ii. torsion bar
    iii. rubber springs
    iv. Macpherson strut system
    v. hydraulic
    vi. hydro-pneumatic
    vii. hydraulic dampers
    viii. trailing arms
    ix. wish bones
    x. ball joints
    xi. track control arms
    xii. bump stops
    xiii. anti-roll bars
    xiv. stabiliser bars
    xv. swinging arms
    xvi. parallel link
    xvii. swinging half-axles
    xviii. transverse link
    xix. semi-swinging arms.
c. The advantages of different systems including:
    i. non-independent
    ii. independent suspension (IFS)
    iii. independent suspension (IRS)
    iv. hydraulic
    v. hydro-pneumatic
    vi. rigid axle.
d. The principles of electronic suspensions systems.
e. The forces acting on suspension systems during braking, driving and cornering.
f. The methods of locating the road wheels against braking, driving and cornering forces.
g. The methods of controlling cornering forces by fitting anti-roll torsion members.
h. Suspension terms:
    i. rebound
    ii. bump
    iii. float
    iv. dive
    v. pitch
    vi. roll
    vii. compliance.

i. The procedures used for inspecting the serviceability and condition of the suspension system
j. Suspension system defects:
    i. wheel hop
    ii. ride height (unequal and low)
    iii. wear
    iv. noises under operation
    v. fluid leakage
    vi. excessive travel
    vii. excessive tyre wear
    viii. bounce
    ix. poor vehicle handling
    x. worn dampers
    xi. worn joints
    xii. damaged linkages.

Brakes

a. The construction and operation of drum brakes:
    i. leading and trailing shoe construction
    ii. self-servo action
    iii. automatic adjusters
    iv. backing plates
    v. parking brake system.
b. The construction and operation of disc brakes:
    i. disc pads
    ii. calliper
    iii. brake disc
    iv. ventilated disc
    v. disc pad retraction
    vi. parking brake system
    vii. electrical and electronic components
    viii. wear indicators and warning lamps.
c. The construction and operation of the hydraulic braking system:
    i. single and dual line layout
    ii. master cylinders
    iii. wheel cylinders
    iv. disc brake calliper and pistons
    v. brake pipe
    vi. brake servo
    vii. warning lights
    viii. parking brakes
    ix. equalising valves.
d. The principles and components of electronic ABS systems, electrical and electronic components.
e. The requirements and hazards of brake fluid:
    i. boiling point
    ii. hygroscopic action
    iii. manufacturer's change periods
    iv. fluid classification and rating
    v. potential to damage paint surfaces.

f. Terms associated with mechanical and hydraulic braking systems:
   i. braking efficiency
   ii. brake fade
   iii. brake balance
   iv. ABS.
g. The procedures used for inspecting the serviceability and condition of the braking system.
h. Braking system defects:
   i. worn shoes or pads
   ii. worn or scored brake surfaces
   iii. abnormal brake noises
   iv. brake judder
   v. fluid contamination of brake surfaces
   vi. fluid leaks
   vii. pulling to one side
   viii. poor braking efficiency
   ix. lack of servo assistance
   x. brake drag
   xi. brake grab
   xii. brake fade.

Wheel and tyres

a. The construction of different types of tyre:
   i. radial
   ii. cross ply
   iii. bias belted
   iv. tread patterns
   v. tyre mixing regulations
   vi. tyre applications.
b. Tyre markings:
   i. tyre and wheel size markings
   ii. speed rating
   iii. direction of rotation
   iv. profile
   v. load rating
   vi. ply rating
   vii. tread-wear indicators.
c. Wheel construction:
   i. light alloy
   ii. pressed steel and wire wheels
   iii. flat-edge and double hump rims.
d. Types of wheel bearing arrangements:
   i. non-driving.
e. Types of bearing used for wheel bearing arrangements:
   i. roller
   ii. taper roller
   iii. needle
   iv. ball and plain.

f. The procedures used for inspecting the serviceability and condition of:
    i. tyres & wheels
    ii. bearings.
g. The defects associated with tyres and wheels:
    i. abnormal tyre wear
    ii. cuts
    iii. side wall damage
    iv. wheel vibrations
    v. tyre noise (squeal during cornering)
    vi. tyre over heating (low pressure)
    vii. tread separation.

General

The procedures for dismantling, removal and replacement of chassis system components

a. The preparation:
    i. testing and use of tools and equipment
    ii. electrical meters and equipment used for dismantling
    iii. removing and replacing chassis systems and components.
b. Appropriate safety precautions:
    i. PPE
    ii. vehicle protection when dismantling
    iii. removing and replacing chassis systems and components.
c. The importance of logical and systematic processes.
d. The inspection and testing of chassis systems and components.
e. The preparation of replacement units for re-fitting or replacement of chassis systems or components.
f. Identify the reasons why replacement components and units must meet the original specifications (OES):
    i. warranty requirements
    ii. to maintain performance
    iii. safety requirements.
g. Refitting procedures.
h. The inspection and testing of units and systems to ensure compliance with manufacturer's, legal and performance requirements.
i. The inspection and re-instatement of the vehicle following repair to ensure customer satisfaction:
    i. cleanliness of vehicle interior and exterior
    ii. security of components and fittings
    iii. re-instatement of components and fittings.

Unit 155 Knowledge of inspecting light vehicles using prescribed methods

UAN:	**H/601/3742**
Level:	2
Credit value:	4
GLH:	40
Relationship to NOS:	This unit is linked to LV05 Inspect Light Vehicles using Prescribed Inspection Methods and LV06 Inspect Light Vehicles.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit enables the learner to develop an understanding of carrying out a range of inspections on light vehicles using a variety of prescribed testing and inspection methods.

Learning outcome	**The learner will:**
1 understand how to carry out inspections on light vehicles using prescribed methods	
Assessment criteria	
The learner can: 1.1 explain the difference between the various prescribed light vehicle inspection methods to include: a. pre-work b. post-work c. pre-delivery d. maintenance inspection (brake, seasonal and tyre) 1.2 identify the different systems to be inspected when using the prescribed inspection methods 1.3 identify the procedures involved in carrying out the systematic inspection of the prescribed inspection methods on light vehicles 1.4 identify correct conformity of vehicle systems and condition on light vehicles inspections 1.5 compare test and inspection results against light vehicle specification and legal requirements 1.6 explain how to record and complete the inspection results in the format required 1.7 identify the recommendations that can be made based on results of	

	the light vehicle inspections
1.8	explain the implications of failing to carry out light vehicle inspections activities correctly
1.9	explain the implications of signing workplace documentation and vehicle records
1.10	explain the procedure for reporting cosmetic damage to light vehicle components and units outside normal inspection items.

Unit 155 Knowledge of inspecting light vehicles using prescribed methods

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Pre and post work vehicle inspections and record findings

a. PPE and vehicle protection relating to:
   i. vehicle body panels
   ii. paint surfaces
   iii. seats
   iv. carpets and floor mats prior to conduction vehicle inspections.
b. Pre and post work vehicle inspection procedures:
   i. aural
   ii. visual and functional assessments on engine
   iii. engine systems
   iv. chassis systems
   v. wheels and tyres
   vi. transmission system
   vii. electrical and electronic systems
   viii. exterior vehicle body
   ix. vehicle interior.
c. The methods for carrying out inspections for: damage, corrosion, fluid leaks, wear, security, mounting security and condition to include:
   i. engines and engine systems
   ii. chassis systems
   iii. brakes
   iv. steering
   v. suspension
   vi. wheels
   vii. tyres
   viii. body panels
   ix. electrical and electronic systems and components
   x. vehicle seating and vehicle interior
   xi. vehicle instrumentation
   xii. driver controls.
d. Check conformity to manufacturer's specifications and legal requirements.
e. Completion of documentation to include:
   i. inspection records
   ii. job cards
   iii. vehicle records.
f. Make recommendations based on results of vehicle inspections.
g. The checks necessary to ensure customer satisfaction for:
   i. vehicle body panels
   ii. paint surfaces
   iii. seats

iv. carpets and floor mats following pre or post vehicle inspections.

h. Prepare and use appropriate inspection equipment and tools.

i. Inspection procedures following inspection checklists.

Unit 161 Knowledge of overhauling light vehicle engine units

UAN:	**R/601/3736**
Level:	3
Credit value:	3
GLH:	20
Relationship to NOS:	This unit is linked to LV11 Overhaul Light Vehicle Mechanical Units.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit enables the learner to develop an understanding of the construction, operation and overhaul of engine units.

Learning outcome	**The learner will:**
1 understand how to overhaul light vehicle engine units	
Assessment criteria	
The learner can: 1.1 identify light vehicle engine unit components 1.2 describe the construction and operation of light vehicle engine units 1.3 explain how to prepare, use and assess all of the overhauling equipment 1.4 explain how light vehicle engine units are dismantled, overhauled and reassembled 1.5 explain common symptoms, causes and faults found in light vehicle engine units 1.6 explain methods used to identify engine unit faults 1.7 explain how to examine, measure and make suitable adjustments to light vehicle engine components 1.8 explain how to evaluate and interpret test results found in diagnosing light vehicle engine unit faults and compare with manufacturers' specifications and settings 1.9 explain how to evaluate the operation of components and systems following overhauling units to confirm system performance.	

Unit 161 Knowledge of overhauling light vehicle engine units

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

How the units and assemblies being overhauled operate

a. Identify unit components.
b. Understand unit construction.
c. Describe unit operation.

How units are dismantled and reassembled

a. The dismantling procedure.
b. Tools and equipment used for stripping and rebuilding units and assemblies.
c. Methods of safe storage for removed components during overhaul activities.
d. The process for assessing the condition of sub-assemblies including:
   i. fit
   ii. tolerances
   iii. permitted limits.
e. The rebuild procedure for units and assemblies.
f. Adjustment procedures during re-assembly.

Unit and assembly testing and evaluation procedures

a. Appropriate testing and evaluation procedures prior to dismantling units.
b. Appropriate testing and evaluation procedures of components after dismantling units.
c. How to use overhauling and test equipment for the task.
d. The cost-benefit relationship between reconditioning, repair and replacement of components within units.
e. How to test and evaluate the performance of the overhauled units against the operating specification.
f. How to interpret test results.
g. Adjustment procedures during final evaluation.

Faults associated with units and assemblies being overhauled

a. Causes of faults and failures within units and assemblies.
b. The faults associated with units and assemblies.
c. How to make adjustments to meet final specification after testing and evaluation of assembled units and assemblies.

The procedures for dismantling, removal and replacement of units and components

a. The preparation, testing and use of:

i. tools and equipment
ii. removal and replacement of electrical and electronic systems and components.

b. Appropriate safety precautions:
    i. PPE
    ii. vehicle protection when dismantling
    iii. removal and replacing electrical and electronic components and systems.
c. The importance of logical and systematic processes.
d. The reasons why replacement components and units must meet the original specifications (OES) – warranty requirements, to maintain performance, safety requirements.
e. Refitting procedures.
f. The inspection and testing of units and systems to ensure compliance with manufacturer's, legal and performance requirements.
g. Inspection and re-instatement of the vehicle following repair to ensure:
    i. customer satisfaction
    ii. cleanliness of vehicle interior and exterior
    iii. security of components and fittings
    iv. re-instatement of components and fittings
    v. cancelling of any fault codes and warning lights.

Unit 162 Knowledge of light vehicle transmission and driveline units and components

UAN:	**Y/601/3740**
Level:	2
Credit value:	5
GLH:	45
Relationship to NOS:	This unit is linked to LV12 Remove and Replace Light Vehicle Driveline Units and Components.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit enables the learner to develop an understanding of the construction and operation of common transmission and driveline systems. It also covers the procedures involved in the removal and replacement of system components and the evaluation of their performance.

Learning outcome	**The learner will:**
1 understand how light vehicle clutch systems operate	
Assessment criteria	
The learner can 1.1 identify light vehicle clutch system components 1.2 describe the construction and operation of light vehicle clutch systems 1.3 compare key light vehicle clutch system components and assemblies against alternatives to identify differences in construction and operation 1.4 identify the key engineering principles that are related to light vehicle clutch systems to include: a. principles of friction b. principle of levers c. torque transmission 1.5 state common terms used in light vehicle clutch system design.	

Learning outcome	The learner will:
2 understand how light vehicle manual gearbox systems operate	
Assessment criteria	
The learner can 2.1 identify light vehicle manual gearbox system components 2.2 describe the construction and operation of light vehicle manual gearbox systems. 2.3 compare key light vehicle manual gearbox system components and assemblies against alternatives to identify differences in construction and operation 2.4 identify the key engineering principles that are related to light vehicle manual gearbox systems a. gear ratios b. torque multiplication 2.5 state common terms used in light vehicle manual gearbox system design.	

Learning outcome	The learner will:
3 understand how light vehicle driveline systems operate	
Assessment criteria	
The learner can 3.1 identify light vehicle driveline components 3.2 describe the construction and operation of light vehicle driveline systems 3.3 compare key light vehicle driveline components and assemblies against alternatives to identify differences in construction and operation 3.4 identify the key engineering principles that are related to light vehicle driveline systems a. final drive and overall gear ratios b. simple stresses 3.5 state common terms used in light vehicle driveline design.	

Learning outcome	The learner will:
4 understand how to check, replace and test transmission and driveline units and components	
Assessment criteria	
The learner can 4.1 describe how to remove and replace transmission and driveline system units and components 4.2. describe common types of testing methods used to check the operation of transmission and driveline systems and their purpose 4.3 explain how to evaluate the performance of replacement units against vehicle specification 4.4 identify common faults found in light vehicle transmission and driveline systems and their causes.	

Unit 162 Knowledge of light vehicle transmission and driveline units and components

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

The operation of clutch operating systems

a. Clutch operating mechanisms
    i. pedal and lever
    ii. hydraulic operated
    iii. mechanical
    iv. cable operated
    v. hydraulic components
    vi. master cylinder
    vii. slave cylinder
    viii. hydraulic pipes
    ix. electrical and electronic components (fluid level indicators).

The operation of friction clutches

a. The reasons for fitting a clutch.
b. The construction and operation of:
    i. hydraulically and cable operated clutches
    ii. coil spring clutches
    iii. diaphragm spring clutches
    iv. single plate clutches
    v. multi plate clutches.

The operation of manual gearboxes

a. The reasons for fitting gearboxes, to provide neutral, reverse, torque multiplication.
b. Different gearbox types: transverse and inline layouts.
c. The layout and construction of gears and shafts for 4, 5 and 6 speed gearbox designs, sliding mesh, constant mesh and synchromesh gearboxes reverse gear.
d. The construction and operation of:
    i. gear selection linkages
    ii. selector forks and rods
    iii. detents and interlock mechanisms
e. The construction and operation of synchromesh devices.
f. The arrangements for gearbox bearings:
    i. bushes
    ii. oil seals
    iii. gaskets and gearbox lubrication
    iv. speedometer drive
g. The electrical and electronic components including reverse lamp switch

h. Calculate gear ratios and driving torque for typical gearbox specifications.

The operation of driveline components

a. The layout and construction of propshafts and drive shafts used in front wheel, rear wheel and four-wheel drive systems.
b. The reasons for using flexible couplings and sliding joints in transmissions systems.
c. The reason for using constant velocity joints in drive shafts incorporating steering mechanisms.
d. The construction and operation of:
    i. universal joints
    ii. sliding couplings
    iii. constant velocity joints
e. The simple stresses applied to shafts: torsional, bending and shear.
f. The construction and operation of:
    i. final drive units
    ii. crown wheel & pinion
    iii. bevel
    iv. hypoid and helical gears
    v. differential gears
    vi. sun & planet gears
    vii. lubricants
    viii. lubrication bearings and seals
    ix. limited slip differential.
g. The reasons for fitting a differential.
h. Calculate final drive gear ratios.
i. Calculate the overall gear ratio from given data (gearbox ratio x final drive ratio).

The testing and inspection techniques used for light vehicle transmission systems

a. The techniques and procedures used for inspecting and testing clutches and clutch mechanisms including:
    i. clearances
    ii. pedal and lever settings
    iii. cables & linkages
    iv. hydraulic system
    v. leaks
    vi. adjustments
    vii. travel.
b. The techniques and procedures used for inspecting and testing gearboxes including:
    i. leaks
    ii. gear selection
    iii. synchromesh operation
    iv. abnormal noise.
c. The techniques and procedures used for inspecting and testing drive line systems (prop & drive shafts, couplings) including:
    i. security
    ii. serviceability of rubber boots
    iii. leaks
    iv. alignment
    v. balance weights (where applicable).
d. The techniques used when inspecting and testing final drive systems including:
    i. fluid levels

ii. leaks
iii. noise.

The faults and symptoms associated with vehicle transmissions systems

a. The faults and symptoms associated with transmission systems:
   i. clutch faults
   ii. gearbox faults
   iii. drive line faults (propshaft, drive shaft, universal and constant velocity joints)
   iv. universal joint alignment
   v. final drive faults.
b. Faults and symptoms to include mechanical, electrical and hydraulic systems.

The procedures for dismantling, removal and replacement of transmission units and components

a. The preparation, testing and use of tools and equipment, electrical meters and equipment used for dismantling removing and replacing transmission systems and components.
b. appropriate safety precautions:
   i. PPE
   ii. vehicle protection when dismantling
   iii. removing and replacing transmission systems and components
c. The importance of logical and systematic processes.
d. The inspection and testing of transmission systems and components
e. The preparation of replacement units for re-fitting or replacement of transmission systems or components.
f. The reasons why replacement components and units must meet the original specifications (OES):
   i. warranty requirements
   ii. to maintain performance
   iii. safety requirements.
g. Refitting procedures.
h. The inspection and testing of units and system to ensure compliance with manufacturer's, legal and performance requirements.
i. The inspection and re-instatement of the vehicle following repair to ensure customer satisfaction:
   i. cleanliness of vehicle interior and exterior
   ii. security of components and fittings.
   iii. re-instatement of components and fittings

Types of wheel bearing arrangements:

a. driven wheels
b. fully floating
c. three quarter floating
d. semi floating axles.

Unit 171 Knowledge of overhauling light vehicle transmission units

UAN:	**Y/601/3737**
Level:	3
Credit value:	3
GLH:	20
Relationship to NOS:	This unit is linked to LV11 Overhaul Light Vehicle Mechanical Units.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit enables the learner to develop an understanding of the construction, operation and overhaul of gearboxes and final drive assemblies.

Learning outcome	**The learner will:**
1 understand how to overhaul light vehicle gearbox and final drive units	
Assessment criteria	
The learner can: 1.1 identify light vehicle gearbox and final dive unit components 1.2 describe the construction and operation of light vehicle gearbox and final drive units 1.3 explain how to prepare, use and assess all of the overhauling equipment 1.4 explain how light vehicle gearbox and final drive units are dismantled, overhauled and reassembled 1.5 explain common symptoms, causes and faults found in light vehicle gearbox and final drive units 1.6 explain methods used to identify gearbox and final drive unit faults 1.7 explain how to examine, measure and make suitable adjustments to light vehicle gearbox and final drive components 1.8 explain how to evaluate and interpret test results found in diagnosing light vehicle gearbox and final drive unit faults and compare with manufacturers' specifications and settings 1.9 explain how to evaluate the operation of components and systems following overhauling units to confirm system performance.	

Unit 171 Knowledge of overhauling light vehicle transmission units

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

How the units and assemblies being overhauled operate

a. Identify unit components.
b. Understand unit construction.
c. Describe unit operation.

How units are dismantled and reassembled

a. The dismantling procedure.
b. Tools and equipment used for stripping and rebuilding units and assemblies.
c. Methods of safe storage for removed components during overhaul activities.
d. The process for assessing the condition of sub-assemblies including:
   i. fit
   ii. tolerances
   iii. permitted limits.
e. The rebuild procedure for units and assemblies.
f. Adjustment procedures during re-assembly.

Unit and assembly testing and evaluation procedures

a. Appropriate testing and evaluation procedures prior to dismantling units.
b. Appropriate testing and evaluation procedures of components after dismantling units.
c. How to use overhauling and test equipment for the task.
d. The cost-benefit relationship between reconditioning, repair and replacement of components within units.
e. How to test and evaluate the performance of the overhauled units against the operating specification.
f. How to interpret test results.
g. Adjustment procedures during final evaluation.

Faults associated with units and assemblies being overhauled

a. Causes of faults and failures within units and assemblies.
b. The faults associated with units and assemblies.
c. How to make adjustments to meet final specification after testing and evaluation of assembled units and assemblies.

The procedures for dismantling, removal and replacement of units and components

a. The preparation, testing and use of:
   i. tools and equipment
   ii. removal and replacement of electrical and electronic systems and components.
b. Appropriate safety precautions:
   i. PPE
   ii. vehicle protection when dismantling
   iii. removal and replacing electrical and electronic components and systems.
c. The importance of logical and systematic processes.
d. Preparation of replacement units for re-fitting or replacement electrical and electronic components and systems.
e. The reasons why replacement components and units must meet the original specifications (OES) – warranty requirements, to maintain performance, safety requirements.
f. Refitting procedures.
g. The inspection and testing of units and systems to ensure compliance with manufacturer's, legal and performance requirements.
h. Inspection and re-instatement of the vehicle following repair to ensure:
   i. customer satisfaction
   ii. cleanliness of vehicle interior and exterior
   iii. security of components and fittings
   iv. re-instatement of components and fittings
   v. cancelling of any fault codes and warning lights.

Unit 172 Knowledge of light vehicle fuel, ignition, air and exhaust system units and components

UAN:	**H/601/3725**
Level:	2
Credit value:	3
GLH:	20
Relationship to NOS:	This unit is linked to LV02 Remove and Replace Light Vehicle Engine Units and Components.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit enables the learner to develop an understanding of the construction and operation of common fuel, ignition, air and exhaust systems. It also covers the procedures involved in the removal and replacement of system components and the evaluation of their performance.

Learning outcome	**The learner will:**
1 understand how light vehicle engine fuel systems operate	
Assessment criteria	
The learner can 1.1 identify light vehicle engine fuel system components 1.2 describe the construction and operation of light vehicle engine fuel systems a. multi point injection b. single point injection 1.3 compare key light vehicle engine fuel system components and assemblies against alternatives to identify differences in construction and operation 1.4 identify the key engineering principles that are related to light vehicle engine fuel systems a. properties of fuels b. combustion processes c. exhaust gas constituents 1.5 state common terms used in light vehicle engine fuel system design.	

Learning outcome	The learner will:
2 understand how light vehicle engine ignition systems operate	
Assessment criteria	
The learner can 2.1 identify light vehicle engine ignition system components 2.2 describe the construction and operation of light vehicle engine ignition systems a. distributor ignition systems b. distributor less ignition systems 2.3 compare key light vehicle engine ignition system components and assemblies against alternatives to identify differences in construction and operation 2.4 identify the key engineering principles that are related to light vehicle engine ignition systems a. flame travel b. ignition timing 2.5 state common terms used in key light vehicle engine ignition system design.	

Learning outcome	The learner will:
3 understand how light vehicle engine air supply and exhaust systems operate	
Assessment criteria	
The learner can 3.1 identify light vehicle engine air supply and exhaust system components 3.2 describe the construction and operation of light vehicle engine air supply and exhaust systems a. supercharging b. turbocharging c. exhaust gas recirculation (egr) d. secondary air injection e. catalytic converters 3.3 compare key light vehicle engine air supply and exhaust system components and assemblies against alternatives to identify differences in construction and operation 3.4 identify the key engineering principles that are related to light vehicle engine air supply and exhaust systems a. sound absorption b. reduction of harmful emissions 3.5 state common terms used in key light vehicle engine air supply and exhaust system design.	

Learning outcome	The learner will:
4 understand how to check, replace and test light vehicle engine fuel system units and components	
Assessment criteria	
The learner can 4.1 describe how to remove and replace engine fuel, air supply and exhaust system units and components 4.2 describe common types of testing methods used to check the operation of engine fuel, air supply and exhaust systems and their purpose 4.3 explain how to evaluate the performance of replacement units against vehicle specification 4.4 explain common faults found in light vehicle fuel, air supply and exhaust systems and their causes.	

Unit 172 Knowledge of light vehicle fuel, ignition, air and exhaust system units and components

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Fuel - Petrol

a. The function and layout of petrol injection systems:
   i. single and multi-point systems
   ii. injection components
   iii. injection pump
   iv. pump relay
   v. injector valve
   vi. air flow sensor
   vii. throttle potentiometer
   viii. idle speed control valve
   ix. coolant sensor
   x. MAP and air temperature sensors
   xi. mechanical control devices
   xii. electronic control units.
b. The operation of single and multi-point petrol injection systems and components:
   i. injection pump
   ii. pump relay
   iii. injector valve
   iv. air flow sensor
   v. throttle potentiometer
   vi. idle speed control valve
   vii. coolant sensor
   viii. MAP and air temperature sensors
   ix. electronic control units
   x. fuel pressure regulators
   xi. fuel pump relays
   xii. lambda exhaust sensors
   xiii. flywheel and camshaft sensors
   xiv. air flow sensors (air flow meter and air mass meter)
   xv. EGR valve.
c. The procedures used when inspecting petrol system.

Fuel – Diesel

a. The layout and construction of inline and rotary diesel systems.
b. The principles and requirements of compression ignition engines:

i. combustion chambers (direct and indirect injection).

c. The function and operation of diesel fuel injection components:
   ii. fuel filters
   iii. sedimenters
   iv. injectors
   v. injector types (direct and indirect injection)
   vi. single
   vii. multi-hole and pintle nozzle types
   viii. governors
   ix. fuel pipes
   x. glow plugs
   xi. cold start devices.
   xii. fuel cut-off solenoid.
d. The purpose and operation of:
   i. turbochargers
   ii. construction
   iii. use of inter-coolers.
e. Explain the procedures for injection pump timing and bleeding the system.
f. The procedures used when inspecting diesel system.

Fuel

a. The meaning of terms related to:
   i. hydro-carbon fuels
   ii. volatility
   iii. calorific value
   iv. flash point
   v. octane value
   vi. cetane value.
b. The composition of hydro-carbon fuels:
   i. % hydrogen and carbon in petrol and diesel fuels.
c. The composition of air (% nitrogen, oxygen), % of oxygen.
d. The chemically correct air/fuel ratio for petrol engines as 14.7:1 (lambda 1, stoichiometric ratio).
e. Weak and rich air/fuel ratios for petrol engines.
f. Exhaust composition and by-products for chemically correct, rich and weak air/fuel ratios of petrol engines:
   i. water vapour (H_2O)
   ii. nitrogen (N)
   iii. carbon monoxide (CO)
   iv. carbon dioxide (CO2)
   v. carbon (C)
   vi. hydrocarbon (HC)
   vii. oxides of nitrogen (NOx, NO2, NO) and particulates.
g. The relative advantages and disadvantages of diesel and petrol engines.
h. Symptoms and faults associated with fuel systems
   i. diesel fuel system: air in fuel system, water in fuel, filter blockage, leaks, difficult starting, erratic running, excessive smoke (black, blue, white), engine knock, turbocharger faults
   ii. petrol injection system: leaks, erratic running, excessive smoke, poor starting, poor performance, poor fuel economy, failure to

start, exhaust emissions, running-on, excessive fuel consumption and surging.

Ignition

a. The layout of electronic ignition systems, advantages over conventional systems (points).
b. Electronic ignition circuits and components:
    i. LT Circuit
    ii. battery
    iii. ignition switch
    iv. electronic trigger devices
    v. capacitor
    vi. HT Circuit
    vii. spark plugs (reach, heat range, electrode features and electrode polarity)
    viii. rotor arm
    ix. distributor (if applicable)
    x. distributor cap
    xi. ignition leads
    xii. ignition coil
    xiii. ignition timing advance system.
c. The operation electronic system components:
    i. amplifiers
    ii. triggering systems
    iii. inductive pick-ups
    iv. hall generators
    v. optical pulse generators
    vi. control units.
d. The operation of amplifier units.
e. Ignition terminology:
    i. dwell angle
    ii. dwell time
    iii. dwell variations
    iv. advance and retard of ignition timing
    v. static and dynamic ignition timing.
f. The operation of electronic ignition systems under various conditions and loads to include:
    i. engine idling
    ii. during acceleration
    iii. under full load
    iv. cruising
    v. overrun
    vi. cold starting.
g. The principles of engine management systems:
    i. closed loop system
    ii. integrated ignition
    iii. injection systems
    iv. sensors.
h. The procedures used when inspecting:
    i. ignition system
    ii. engine management

iii. sensors.

i. Symptoms and faults associated with ignition system operation:
   i. Failure to start hot or cold, erratic running, poor performance, misfire, exhaust emissions misfiring and ignition noise (pinking).

Air supply and exhaust systems

a. The construction and purpose of air filtration systems.
b. The operating principles of air filtration systems.
c. The construction and purpose of the exhaust systems.
d. The operating principles of the systems.
e. Exhaust system design to include silencers and catalytic converters.
f. The procedures used when inspecting induction, air filtration and exhaust systems.
g. Symptoms and faults associated with air and exhaust systems:
   i. exhaust gas leaks
   ii. air leaks.

General

a. The preparation, testing and use of tools and equipment used for:
   i. dismantling
   ii. removal and replacement of engine units and components.
b. Appropriate safety precautions:
   i. PPE
   ii. vehicle protection when dismantling
   iii. removal and replacing engine units and components.
c. The importance of logical and systematic processes.
d. The inspection and testing of engine units and components.
e. The preparation of replacement units for re-fitting or replacement.
f. The reasons why replacement components and units must meet the original specifications (OES) – warranty requirements, to maintain performance and safety requirements.
g. Refitting procedures.
h. The inspection and testing of units and system to ensure compliance with manufacturer's, legal and performance requirements.
i. The inspection and re-instatement of the vehicle following repair to ensure customer satisfaction:
   i. cleanliness of vehicle interior and exterior
   ii. security of components and fittings
   iii. re-instatement of components and fittings.

Unit 181 Knowledge of overhauling light vehicle steering and suspension units

UAN:	**D/601/3738**
Level:	3
Credit value:	20
GLH:	3
Relationship to NOS:	This unit is linked to LV11 Overhaul Light Vehicle Mechanical Units.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit enables the learner to develop an understanding of the construction and operation and overhaul of steering and suspension units.

Learning outcome	**The learner will:**
1 understand how to overhaul light vehicle steering and suspension units	
Assessment criteria	
The learner can: 1.1 identify light vehicle steering and suspension unit components 1.2 describe the construction and operation of light vehicle steering and suspension units 1.3 explain how to prepare, use and assess all of the overhauling equipment 1.4 explain how light vehicle steering and suspension units are dismantled, overhauled and reassembled 1.5 explain common symptoms, causes and faults found in light vehicle steering and suspension units 1.6 explain methods used to identify steering and suspension unit faults 1.7 explain how to examine, measure and make suitable adjustments to light vehicle steering and suspension components 1.8 explain how to evaluate and interpret test results found in diagnosing light vehicle steering and suspension unit faults and compare with manufacturers' specifications and settings 1.9 explain how to evaluate the operation of components and systems following overhauling units to confirm system performance.	

Unit 181 Knowledge of overhauling light vehicle steering and suspension units

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

How the units and assemblies being overhauled operate

a. Identify unit components.
b. Understand unit construction.
c. Describe unit operation.

How units are dismantled and reassembled

a. The dismantling procedure.
b. Tools and equipment used for stripping and rebuilding units and assemblies.
c. Methods of safe storage for removed components during overhaul activities.
d. The process for assessing the condition of sub-assemblies including:
   i. fit
   ii. tolerances
   iii. permitted limits.
e. The rebuild procedure for units and assemblies.
f. Adjustment procedures during re-assembly.

Unit and assembly testing and evaluation procedures

a. Appropriate testing and evaluation procedures prior to dismantling units.
b. Appropriate testing and evaluation procedures of components after dismantling units.
c. How to use overhauling and test equipment for the task.
d. The cost-benefit relationship between reconditioning, repair and replacement of components within units.
e. How to test and evaluate the performance of the overhauled units against the operating specification.
f. How to interpret test results.
g. Adjustment procedures during final evaluation.

Faults associated with units and assemblies being overhauled

a. Causes of faults and failures within units and assemblies.
b. The faults associated with units and assemblies.
c. How to make adjustments to meet final specification after testing and evaluation of assembled units and assemblies.

The procedures for dismantling, removal and replacement of electrical and electronic units and components

a. The preparation, testing and use of:
   i. tools and equipment
   ii. removal and replacement of electrical and electronic systems and components.
b. Appropriate safety precautions:
   i. PPE
   ii. vehicle protection when dismantling
   iii. removal and replacing electrical and electronic components and systems.
c. The importance of logical and systematic processes.
d. Preparation of replacement units for re-fitting or replacement electrical and electronic components and systems.
e. The reasons why replacement components and units must meet the original specifications (OES) – warranty requirements, to maintain performance, safety requirements.
f. Refitting procedures.
g. The inspection and testing of units and systems to ensure compliance with manufacturer's, legal and performance requirements.
h. Inspection and re-instatement of the vehicle following repair to ensure:
   i. customer satisfaction
   ii. cleanliness of vehicle interior and exterior
   iii. security of components and fittings
   iv. re-instatement of components and fittings
   v. cancelling of any fault codes and warning lights.

Unit 218 Skills in removing and fitting of basic light vehicle mechanical, electrical and trim (MET) components and non permanently fixed vehicle body panels

UAN:	**K/601/3869**
Level:	2
Credit value:	3
GLH:	20
Relationship to NOS:	This unit is linked to BP18 Remove and Fit Basic Motor Mechanical, Electrical and Trim (MET) Components and Non Permanently Fixed Motor Vehicle Body Panels.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit allows the learner to demonstrate they can carry out a range of removal and fitting of basic mechanical, electrical and trim (MET) components and non-permanently fixed light vehicle body panels. It also covers the evaluation of the operation of the components when fitted.

Learning outcome	**The learner will:**
1	be able to work safely when carrying out removal and fitting of basic MET components and non-permanently fixed light vehicle body panels
Assessment criteria	
The learner can	
1.1	use suitable personal protective equipment and vehicle coverings throughout all light vehicle removal and fitting of basic MET components and non-permanently fixed light vehicle body panels
1.2	work in a way which minimises the risk of damage or injury to the vehicle, people and the environment.

Learning outcome	The learner will:
2 be able to use relevant information to carry out the task	
Assessment criteria	
The learner can 2.1 select suitable sources of technical information to support light vehicle removal and fitting activities including: a. vehicle technical data b. removal and fitting procedures c. legal requirements 2.2 use technical information to support light vehicle removal and fitting activities.	

Learning outcome	The learner will:
3 be able to use appropriate tools and equipment	
Assessment criteria	
3.1 select the appropriate tools and equipment necessary for carrying out removal and fitting of basic MET components and non-permanently fixed light vehicle body panels 3.2 ensure that equipment has been calibrated to meet manufacturers' and legal requirements 3.3 use the correct tools and equipment in the way specified by manufacturers when carrying out removal and fitting of basic MET components and non-permanently fixed light vehicle body panels.	

Learning outcome	The learner will:
4 be able to carry out removal and fitting of basic MET components and non-permanently fixed light vehicle body panels	
Assessment criteria	
The learner can 4.1 remove and fit basic MET components and non-permanently fixed light vehicle body panels 4.2 ensure that the removal and fitting of basic MET components and non-permanently fixed light vehicle body panels conforms to the vehicle operating specification and any legal requirements 4.3 ensure no damage occurs to other components when carrying out removal and fitting of basic MET components and non-permanently fixed light vehicle body panels 4.4 ensure all components and panels are stored safely and in the correct location.	

Learning outcome	The learner will:
5 be able to record information and make suitable recommendations	
Assessment criteria	
The learner can 5.1 produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required 5.2 make suitable and justifiable recommendations for cost effective repairs 5.3 record and report any additional faults noticed during the course of their work promptly in the format required.	

Unit 218 Skills in removing and fitting of basic light vehicle mechanical, electrical and trim (MET) components and non permanently fixed vehicle body panels

Assessment requirements

The assessment requirements are shown in full in the assessment documentation.

Unit 268 Knowledge in removing and fitting of basic light vehicle mechanical, electrical and trim (MET) components and non permanently fixed vehicle body panels

UAN:	**F/601/3747**
Level:	2
Credit value:	2
GLH:	20
Relationship to NOS:	This unit is linked to BP18 Remove and Fit Basic Motor Mechanical, Electrical and Trim (MET) Components and Non Permanently Fixed Motor Vehicle Body Panels.
Assessment requirements specified by a sector or regulatory body:	This unit was developed by the IMI, the sector skills council for the automotive retail industry. All assessments have been developed in accordance with the IMI Assessment Requirements for VRQs.
Aim:	This unit enables the learner to develop an understanding of carrying out a range of removal and fitting of basic mechanical, electrical and trim (MET) components and non-permanently fixed light vehicle body panels. It also covers the evaluation of the operation of the components when fitted.

Learning outcome	**The learner will:**
1 understand how to carry out removal and fitting of basic light vehicle mechanical electrical and trim (MET) components	
Assessment criteria	
The learner can 1.1 identify the procedures involved in carrying out the systematic removal and fitting of basic light vehicle MET components to the standard required including: a. bumpers b. headlamp units c. road wheels d. batteries e. bonnet and boot trim f. interior trim components g. exterior trim components	

1.2	identify the procedures involved in working with supplementary safety systems when fitting basic light vehicle MET components
1.3	identify the procedures involved in working with gas discharge headlamp systems when fitting basic light vehicle MET components
1.4	explain the methods and procedures for storing removed light vehicle MET components
1.5	identify the different types of fastenings and fixings used when removing and fitting light vehicle MET components
1.6	explain the reasons for the use of different types of fastenings and fixings used in light vehicle MET components
1.7	explain the procedures, methods and reasons for ensuring correct alignment of light vehicle MET components
1.8	identify the quality checks that can be used to ensure correct alignment and operation of light vehicle MET components
1.9	identify correct conformity of vehicle systems against light vehicle specification and legal requirements on completion
1.10	explain the procedure for reporting cosmetic damage to light vehicle MET components and units.

Learning outcome	**The learner will:**
2	understand how to carry out removal and fitting of basic light vehicle non permanently fixed vehicle body panels
Assessment criteria	
The learner can	
2.1	identify the procedures involved in carrying out the systematic removal and fitting of basic light vehicle non-welded, non-structural body panels to the standard required including: a. wings b. doors c. bonnets d. boot lids and tailgates e. bumper bars, covers and components
2.2	identify the procedures involved in working with supplementary safety systems when fitting basic light vehicle non-welded, non-structural body panels
2.3	explain the methods and procedures for storing removed light vehicle non-welded, non-structural body panels
2.4	identify the different types of fastenings and fixings used when removing and fitting light vehicle non-welded, non-structural body panels
2.5	explain the reasons for the use of different types of fastenings and fixings used in light vehicle non-welded, non-structural body panels
2.6	explain the procedures, methods and reasons for ensuring correct alignment of light vehicle non-welded, non-structural body panels
2.7	identify the quality checks that can be used to ensure correct alignment and operation of light vehicle non-welded, non-structural body panels
2.8	identify correct conformity of vehicle systems against light vehicle specification and legal requirements on completion
2.9	explain the procedure for reporting cosmetic damage to light vehicle non-welded, non-structural body panels.

Unit 268 Knowledge in removing and fitting of basic light vehicle mechanical, electrical and trim (MET) components and non permanently fixed vehicle body panels

Supporting information

Candidates will be assessed on the assessment criteria as specified within the unit. The following information has been provided by IMI SSC and is included to support centres in terms of teaching and delivery.

Describe procedures to prevent damage to the vehicle, components and contents when removing, storing and refitting basic MET components

a. The methods that can be used to protect undamaged items to ensure they are removed and refitted without causing unnecessary damage:
   i. bumpers
   ii. headlamp units
   iii. road wheels
   iv. batteries
   v. bonnet and boot trim
   vi. interior trim components
   vii. exterior trim components.
b. The procedures for the correct storage of vehicle contents.
c. The process for the reporting of extra damage and items that may have broken when removed or refitted.

The processes involved when handling batteries

a. The procedure for the removal, storage and refitting of lead acid batteries.
b. The procedure for the disposal of lead acid batteries.
c. Battery checks:
   i. electrolyte
   ii. discharge
   iii. specific gravity.
d. The charging process and procedures:
   i. trickle charge
   ii. normal charge
   iii. boost / start.
e. The health and safety issues involved when charging (explosive gasses).

Types of clips and fixings

a. The following types of clips and identify reasons and limitations for their use:
   i. speed
   ii. 'c'
   iii. 'd'
   iv. 'j' type captive nut
   v. 'r'
   vi. 'u' type captive nut
   vii. cable clip
   viii. trim clips.

b. The following types of fixings and identify reasons and limitations for their use:
   i. pop rivet
   ii. plastic rivet
   iii. plastic capture nut
   iv. nut and bolt
   v. soulder bolt
   vi. 'Nyloc' type nuts
   vii. washers
   viii. 'Spring' type washers
   ix. self tapping screws and bolts
   x. quick release plastic trim fastenings
   xi. trim tapes
   xii. adhesives and sealers.

The processes involved when carrying out quality checks

a. Items that may have been 'workshop' soiled and describe processes for rectifying:
   i. door cards
   ii. seats
   iii. carpets
   iv. boot and bonnet trims

b. Methods for checking gaps.

c. The process for checking and aligning headlamps:
   i. address handling procedures for halogen bulbs
   ii. address handling and health and safety issues relating to xenon bulbs and systems.

d. Operational checks and rectification methods to include:
   i. lights
   ii. washers and wipers
   iii. SRS systems (checking not rectification)
   iv. charging system (checking not rectification)
   v. horn
   vi. fluid levels
   vii. interior switches
   viii. operation of door lock mechanisms.

Removing and Fitting Non-Structural Body Panels

a. Find, interpret and use sources of information applicable to the removal and fitting of basic non welded non-structural body panels.
b. Select check and use all the tools and equipment required to remove and fit basic non welded non-structural body panels including:
    i. hinge pin removers
    ii. spanners
    iii. screwdrivers.
c. The different types of mechanical fixings for non welded non-structural body panels and when and why they should be used including:
    i. bolts
    ii. self tapping bolts
    iii. speed nuts
    iv. washers.
d. The correct procedures and processes for removing and fitting of non welded non-structural body panels.
e. The need for correct alignment of panels and methods to achieve this:
    i. aperture gaps
    ii. alignment of panel features
    iii. best fit of components to panels
    iv. vehicle geometry
    v. operation of openings such as doors, tailgates, bonnets etc.
f. The types of quality control checks that can be used to ensure correct alignment and contour of panels and operation of components to manufacturer's specification.
g. The method of storing removed panels and the importance of storing them correctly.

Appendix 1 Relationships to other qualifications

Links to other qualifications

Mapping is provided as guidance and suggests areas of commonality between the qualifications. It does not imply that candidates completing units in one qualification have automatically covered all of the content of another.

Centres are responsible for checking the different requirements of all qualifications they are delivering and ensuring that candidates meet requirements of all units/qualifications.

These qualifications have connections to the 4270 Level 2/3 VCQs in Light Vehicle Maintenance and Repair.

Literacy, language, numeracy and ICT skills development

These qualifications can develop skills that can be used in the following qualifications:

- Functional Skills (England) – see **www.cityandguilds.com/functionalskills**
- Essential Skills (Northern Ireland) – see **www.cityandguilds.com/essentialskillsni**
- Essential Skills Wales – see **www.cityandguilds.com/esw**

Appendix 2 Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the **Centres and Training Providers homepage** on **www.cityandguilds.com**.

Centre Manual - Supporting Customer Excellence contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve 'approved centre' status, or to offer a particular qualification, as well as updates and good practice exemplars for City & Guilds assessment and policy issues. Specifically, the document includes sections on:

- The centre and qualification approval process
- Assessment, internal quality assurance and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Management systems
- Maintaining records
- Assessment
- Internal quality assurance
- External quality assurance.

Our Quality Assurance Requirements encompasses all of the relevant requirements of key regulatory documents such as:

- SQA Awarding Body Criteria (2007)
- NVQ Code of Practice (2006)

and sets out the criteria that centres should adhere to pre and post centre and qualification approval.

Access to Assessment & Qualifications provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The **centre homepage** section of the City & Guilds website also contains useful information such on such things as:

- **Walled Garden:** how to register and certificate candidates on line
- **Events**: dates and information on the latest Centre events
- **Online assessment**: how to register for e-assessments.

City & Guilds

Believe you can

www.cityandguilds.com

Useful contacts

UK learners General qualification information	T: +44 (0)844 543 0033 E: **learnersupport@cityandguilds.com**
International learners General qualification information	T: +44 (0)844 543 0033 F: +44 (0)20 7294 2413 E: **intcg@cityandguilds.com**
Centres Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: **centresupport@cityandguilds.com**
Single subject qualifications Exam entries, Results, Certification, Missing or late exam materials, Incorrect exam papers, Forms request (BB, results entry), Exam date and time change	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 F: +44 (0)20 7294 2404 (BB forms) E: **singlesubjects@cityandguilds.com**
International awards Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: **intops@cityandguilds.com**
Walled Garden Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413 E: **walledgarden@cityandguilds.com**
Employer Employer solutions, Mapping, Accreditation, Development Skills, Consultancy	T: +44 (0)121 503 8993 E: **business@cityandguilds.com**
Publications Logbooks, Centre documents, Forms, Free literature	T: +44 (0)844 543 0000 F: +44 (0)20 7294 2413

Every effort has been made to ensure that the information contained in this publication is true and correct at time of publication. However, City & Guilds products and services are subject to continuous development and improvement, and the right is reserved to change products and services from time to time. City & Guilds cannot accept responsibility for any loss or damage arising from the use of information in this publication.

If you have a complaint, or any suggestions for improvement about any of the services that we provide, email: **feedbackandcomplaints@cityandguilds.com**

About City & Guilds

As the UK's leading vocational education organisation, City & Guilds is leading the talent revolution by inspiring people to unlock their potential and develop their skills. We offer over 500 qualifications across 28 industries through 8500 centres worldwide and award around two million certificates every year. City & Guilds is recognised and respected by employers across the world as a sign of quality and exceptional training.

City & Guilds Group

The City & Guilds Group operates from three major hubs: London (servicing Europe, the Caribbean and Americas), Johannesburg (servicing Africa), and Singapore (servicing Asia, Australia and New Zealand). The Group also includes the Institute of Leadership & Management (management and leadership qualifications), City & Guilds Land Based Services (land-based qualifications), the Centre for Skills Development (CSD works to improve the policy and practice of vocational education and training worldwide) and Learning Assistant (an online e-portfolio).

Copyright

The content of this document is, unless otherwise indicated, © City & Guilds Limited and may not be copied, reproduced or distributed without prior written consent. However, approved City & Guilds centres and candidates studying for City & Guilds qualifications may photocopy this document free of charge and/or include a PDF version of it on centre intranets on the following conditions:

- centre staff may copy the material only for the purpose of teaching candidates working towards a City & Guilds qualification, or for internal administration purposes
- candidates may copy the material only for their own use when working towards a City & Guilds qualification

The *Standard Copying Conditions* (see the City & Guilds website) also apply.

Please note: National Occupational Standards are not © City & Guilds Limited. Please check the conditions upon which they may be copied with the relevant Sector Skills Council.

Published by City & Guilds Limited, a company registered in England and Wales (company number 16513878).

City & Guilds
1 Giltspur Street
London EC1A 9DD
T +44 (0)844 543 0000
F +44 (0)20 7294 2413
www.cityandguilds.com

WW-01-4290