

Level 1 Diploma in Accident Repair Body (4291-11)

June 2020
Version 1.6





Qualification at a glance

Subject area	Accident Repair
City & Guilds number	4291
Age group approved	All
Entry requirements	None
Assessment	Online Multiple Choice, Oral questions and Practical Tasks
Fast track	Not Available
Support materials	Centre handbook Assessment documentation
Registration and certification	See Walled Garden/Online Catalogue for last dates

Title and level	GLH	TQT	City & Guilds number	Accreditation number
Level 1 Diploma in Accident Repair Body	710	810	4291-11	501/0016/6

Version and date	Change detail	Section
1.1 Oct 2011	Deleted incorrect unit	Units
1.2 June 2012	Amend Unit number	Units
1.3 July 2012	Add range – Units 026	Units
1.4 Dec 2012	Amendments to range – General formatting	Units
1.5 Sept 2013	Unit supporting information updated with introductory text	Units
1.6 June 2020	TQT added	At a glance



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1 Introduction

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

Area	Description
Who is the qualification for?	These automotive qualifications are for anyone interested in starting or developing a career in the motor industry in areas such as a specialist repair or specialist finisher in a car bodywork workshop. You don't need any previous experience or a current work placement. You might be a young learner or an adult. These qualifications encompass theoretical knowledge and the development of practical skills to enable learners to work on routine tasks under minimal supervision.
What does the qualification cover?	It allows candidates to learn, develop and practise the skills required for employment and/or career progression in the automotive industry in areas such as a specialist repair or specialist finisher in a car bodywork workshop.
Is the qualification part of a framework or initiative?	This qualification is available within the foundation learning framework.
What opportunities for progression are there?	It allows candidates to progress into employment or to the following City & Guilds qualifications: <ul style="list-style-type: none"> • 4291 -12 City & Guilds Level 2 Diploma in Accident Repair Body Principles • 4271 -12 City & Guilds Level 2 Diploma in Accident Repair Body Competence

Structure

Qualification	Credits			
	Total	Mandatory	Optional	Additional
City & Guilds Level 1 Diploma in Accident Repair Body (QCF) (4291-11)	44	32 credits	12	6 (max)
		any from 001 031 051 081 (026 and 076) 109 and 159	107 157 177 (218 and 268) (102 and 152) 712-718 720-723	from 801 to 822

Unit accreditation number	City & Guilds unit number	Unit title	Credit
Y/601/7254	4291-001	Skills in Health, Safety and Good Housekeeping in the Automotive Environment	7
D/601/6171	4291-051	Knowledge of Health, Safety and Good Housekeeping in the Automotive Environment	3
Y/601/6265	4291-031	Skills to Support Working Relationships in the Automotive Work Environment	3
F/601/6180	4291-081	Knowledge to Support working relationships in the Automotive Work Environment	3
L/502/1646	4291-076 4291-026	Introduction to vehicle technology and workshop methods and processes	6
L501/3515	4291-109 4291-159	Valet vehicles	10
K/601/3872	4291-107	Skills in Removing and Replacing Light Vehicle Engine Units and Components	5
R/601/3719	4291-157	Knowledge of Light Vehicle Engine Mechanical, Lubrication and Cooling System Units and Components	3
H/601/3725	4291-177	Knowledge of Light Vehicle Fuel, Ignition, Air and Exhaust System Units and Components	3
K/601/3869	4291-218	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	4291-268	Knowledge of Removing and Fitting Basic Light Vehicle Mechanical, Electrical and Trim _MET_ Components and Non Permanently Fixed Vehicle Body Panels	2
R/601/5454	4291-102	Skills in Removing and Fitting Non Permanently Fixed Motor Vehicle Body Panels	2
D/601/5425	4291-152	Knowledge of Removing and Fitting Non Permanently Fixed Motor Vehicle Body Panels	2
A/600/4562	4291-712	Introduction to Vehicle Workshop Bench Skills	4
K/601/7291	4291-713	Basics of Vehicle Body Fitting	4
M/601/7292	4291-714	Basics of Vehicle Mechanical Electrical Trim	4
T/601/7293	4291-715	Fundamental Vehicle Body Repair Techniques	4

Unit accreditation number	City & Guilds unit number	Unit title	Credit
A/601/7294	4291-716	Introduction to Vehicle MAG Welding Techniques	3
F/601/7295	4291-717	Introduction to Vehicle Resistance Spot Welding Techniques	2
J/601/7296	4291-718	Introduction to Vehicle Panel Preparation Techniques	3
R/601/7298	4291-720	Application of Paint Materials to Vehicles Using Spray Gun Techniques	3
T/602/2039	4291-721	Mix foundation coat materials for spray gun application	2
R/600/5121	4291-722	Vehicle Hand Skills and Manufacturing Techniques	4
Y/602/2132	4291-723	Prepare vehicle body panels for foundation coat materials using masking materials and techniques	4

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).

In addition, learners registered for this qualification will be able to take as additional units any of the following (801-822) as part of their foundation learning programme. These units have been imported from qualification (7546) Award/Certificate/Diploma in Employability and Personal Development. For more information about these units, please check (7546) qualification handbook in our website www.cityandguilds.com



2 Centre requirements

Approval

Centres already approved to offer the qualification Level 1 Certificate/Diploma in Automotive Body and Paint – Body Repair (4101-56) will be automatically approved to register and certificate candidates on the 4291-11 complex (unless the centre is already subject to sanctions).

To offer this qualification, new centres will need to gain both centre and qualification approval. Please refer to the *Centre Manual - Supporting Customer Excellence* for further information.

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

Internal quality assurance

Approved centres must have effective quality assurance systems to ensure optimum delivery and assessment of qualifications.

Quality assurance includes: initial centre approval, qualification approval and the centre's own internal procedures for monitoring quality. Centres are responsible for internal quality assurance, and City & Guilds is responsible for external quality assurance.

National standards and rigorous quality assurance are maintained by the use of:

- City & Guilds practical tasks, marked by the centre according to externally set marking criteria
- internal (centre) quality assurance
- City & Guilds external verification.

To meet the quality assurance criteria for this qualification, the centre must ensure that the following internal roles are undertaken:

- quality assurance co-ordinator
- assessor
- internal verifier/moderator
- examinations secretary.

Full details and guidance on the internal and external quality assurance requirements and procedures are provided in *Centre Manual - Supporting Customer Excellence*, together with full details of the tasks, activities and responsibilities of quality assurance staff.

In order to fully support candidates, centres are required to retain copies of candidates' assessment records for three years after certification.

External quality assurance

External verifiers are appointed by City & Guilds to approve centres, and to monitor the assessment and internal quality assurance carried out by centres. External verification is carried out to ensure that assessment is valid and reliable, and that there is good assessment practice in centres.

To carry out their quality assurance role, external verifiers/moderators must have appropriate occupational and verifying knowledge and expertise. City & Guilds external verifiers attend training and development designed to keep them up-to-date, to facilitate standardisation between verifiers and to share good practice.

External verifiers

The role of the external verifier is to:

- provide advice and support to centre staff
- ensure the quality and consistency of assessments within and between centres by the use of systematic sampling
- regularly visit centres to ensure they continue to meet the centre and qualification approval criteria
- provide feedback to centres and to City & Guilds

External quality assurance for the qualification will be provided by the usual City & Guilds external verification process. This includes the use of an electronically scannable report form which is designed to provide an objective risk analysis of individual centre assessment and verification practice. Further details of the role of external verifiers are given in *Centre Manual - Supporting Customer Excellence*.

Resource requirements

Physical resources and site agreements

Centres must have access to sufficient equipment in the centre or workplace to ensure candidates have the opportunity to cover all of the practical activities. The equipment, systems and machinery must meet industry standards and be capable of being used under normal working conditions.

Centre staffing

Centre staff must satisfy the requirements for occupational expertise for this qualification. These requirements are as follows:

- Staff should be technically competent in the areas for which they are delivering training and/or should also have experience of providing training.
- Assessors and tutors should have at least two years' recent relevant experience in the specific area they will be assessing. If this experience is part-time it should be over a period of five years.
- Centre staff may undertake more than one role, e.g. tutor and assessor or internal verifier, but cannot internally verify their own assessments.

Assessors and Internal Quality Assurer

Assessor and verifier requirements

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

There are no formal entry requirements for candidates undertaking this qualification. However, centres must ensure that candidates have the potential and opportunity to be successful in gaining their qualification.

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

There are no age limits attached to candidates undertaking the qualification.



3 Delivering the qualification

Initial assessment and induction

Centres will need to make an initial assessment of each candidate prior to the start of their programme to ensure they are entered for an appropriate type and level of qualification.

The initial assessment should identify any specific training needs the candidate may have, and the support and guidance they may require when working towards their qualification.

City & Guilds recommends that centres provide an induction programme to ensure the candidate fully understands the requirements of the qualification they will work towards, their responsibilities as a candidate, and the responsibilities of the centre. It may be helpful to record the information on a learning contract.

Further guidance about initial assessment and induction, as well as a learning contract that centres may use, are available in the Centre toolkit.

Support materials

The following resources are available for this qualification:

- Qualification handbook
- Assessment documentation.

Recording documents

Candidates and centres may decide to use a paper-based or electronic method of recording evidence.

To support the delivery of vocational qualifications we offer our own e-portfolio, Learning Assistant, an easy-to-use and secure online tool to support and evidence learners' progress towards achieving qualifications. Further details are available at: www.cityandguilds.com/eportfolios.

City & Guilds has developed assessment documentation specifically for this qualification. Amendable (MS Word) versions of the assessment documentation is available on the City & Guilds website.

Although new centres are expected to use this documentation, centres may devise or customise alternative forms, which must be approved for use by the external verifier, before they are used by candidates and assessors at the centre.

Recommended delivery strategies

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

Provided that the requirements for the qualification are met, centres may design course programmes of study in any way that they feel best meets the needs and capabilities of their candidates. Centres may wish to include topics as part of the course programme, which will not be assessed through the qualification.

Relationship to other qualifications and the wider curriculum

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

This qualification has connections to the following qualifications:

- Award and Certificate in Employability and Personal Development (7546)
-
- Units from this qualification have been imported (units 801-822) so they can be delivered along the automotive units as part of a Foundation Learning Programme. For more information about these units, please check (7546) qualification handbook in our website **www.cityandguilds.com**
- Entry Level 3 and Level 1 Award, Certificate and Diploma in Vehicle Systems and Body & Paint Maintenance (3902)

The following units have been imported:

- 4291-712 (3902-012) Introduction to Vehicle Workshop Bench Skills
- 4291-713 (3902-013) Basics of vehicle body fitting
- 4291-714 (3902-014) Basics of Vehicle Mechanical Electrical Trim
- 4291-715 (3902-015) Fundamental Vehicle Body Repair Techniques
- 4291-716 (3902-016) Introduction to Vehicle MAG Welding Techniques
- 4291-717 (3902-017) Introduction to Vehicle Resistance Spot Welding Techniques
- 4291-718 (3902-018) Introduction to Vehicle Panel Preparation Techniques
- 4291-720 (3902-020) Application of Paint Materials to Vehicles Using Spray Gun Techniques
- 4291-721 (3902-021) Mix foundation coat materials for spray gun application
- 4291-722 (3902-112) Vehicle Hand Skills and Manufacturing Techniques
- 4291-723 (3902-023) Prepare vehicle body panels for foundation coat materials using masking materials and techniques

Health & Safety

The requirement to follow safe working practices is an integral part of all City & Guilds qualifications and assessments, and it is the responsibility of centres to ensure that all relevant health and safety requirements are in place before candidates start practical assessments.

Should a candidate fail to follow Health & Safety practice and procedures during an assessment, the assessment must be stopped. The candidate should be informed that they have not reached the standard required to successfully pass the assessment and told the reason why. Candidates may retake the assessment at a later date, at the discretion of the centre. In case of any doubt, guidance should be sought from the external verifier.

Guidance on risk management of pre 16 candidates

Centres offering the City & Guilds Level 1 Diploma in Accident Repair Body 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.

Data protection and confidentiality

Centres offering this qualification may need to provide City & Guilds with personal data for staff and candidates. Guidance on data protection and the obligations of City & Guilds and centres are explained in *Centre Manual - Supporting Customer Excellence*.

Initial assessment and induction

Centres will need to make an initial assessment of each candidate prior to the start of their programme to ensure they are entered for an appropriate type and level of qualification.

The initial assessment should identify any specific training needs the candidate may have, and the support and guidance they may require when working towards their qualification.

City & Guilds recommends that centres provide an induction programme to ensure the candidate fully understands the requirements of the qualification they will work towards, their responsibilities as a candidate,

and the responsibilities of the centre. It may be helpful to record the information on a learning contract.

Further guidance about initial assessment and induction, as well as a learning contract that centres may use, are available in the Centre toolkit.

Equal opportunities

It is a requirement of centre approval that centres have an equal opportunities policy (see *Centre Manual - Supporting Customer Excellence*).

The regulatory authorities require City & Guilds to monitor centres to ensure that equal opportunity policies are being followed.

The City & Guilds equal opportunities policy is set out on the City & Guilds website, in *Centre Manual - Supporting Customer Excellence*, and is also available from the City & Guilds Customer Relations department.

Access to qualifications on the Qualification Credit Framework is open to all, irrespective of gender, race, creed, age or special needs. The centre co-ordinator should ensure that no candidate is subject to unfair discrimination on any ground in relation to access to assessment and the fairness of the assessment.

Access to assessment

City & Guilds' guidance and regulations on access to assessment are designed to facilitate access to assessments and qualifications for candidates who are eligible for adjustments to assessment arrangements. Access arrangements are designed to allow attainment to be demonstrated. For further information, please see *Access to assessment and qualifications*, available on the City & Guilds website.

Appeals

Centres must have their own, auditable, appeals procedure that must be explained to candidates during their induction. Appeals must be fully documented by the quality assurance co-ordinator and made available to the external verifier or City & Guilds.

Further information on appeals is given in *Centre Manual - Supporting Customer Excellence*. There is also information on appeals for centres and learners on the City & Guilds website or available from the Customer Relations department.



4 Assessment

Assessment of the qualification

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

- online multiple choice tests, using the GOLA system graded as follows:
 - Pass 60%
 - Credit 70%
 - Distinction 80%.
- assessment documentation which contains oral questioning and practical tasks which 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 infer occupational competence.

Time constraints

There are no time constraints applied to the assessment of this qualification. It is recommended that 375-381 guided learning hours should be allocated for this qualification, although patterns of delivery are likely to vary.

If centres have queries regarding the length of time required to complete a particular task, they should contact their external verifier in the first instance who will advise accordingly and feed this information back to City & Guilds where appropriate.

Recognition of prior learning (RPL)

Recognition of prior learning means using a learner's previous experience or qualifications which have already been achieved, to contribute to a new qualification.

RPL is allowed and is also sector specific.



5 Units

Structure of units

Each unit contains the following:

- City & Guilds reference number
- unit accreditation number (UAN)
- title
- level
- credit value (and GLH)
- unit aim
- learning outcomes which are comprised of a number of assessment criteria
- notes for guidance.

Summary of units

City & Guilds unit number	Unit title	Unit accreditation number
4290-001	Skills in health, safety and good housekeeping in the automotive environment	Y/601/7254
4290-026 4290-076	Introduction to vehicle technology and workshop methods and processes	L/502/1646
4290-031	Skills to support working relationships in the automotive work environment	Y/601/6265
4290-051	Knowledge of health, safety and good housekeeping in the automotive environment	D/601/6171
4290-081	Knowledge to support working relationships in the automotive work environment	F/601/6180
4290-102	Skills in removing and replacing light vehicle engine units and components	K/601/3872
4290-107	Skills in removing and replacing light vehicle engine units and components	K/601/3872
4290-109 4290-159	Valet vehicles	L501/3515
4290-152	Knowledge of light vehicle engine mechanical, lubrication and cooling system units and components	R/601/3719
4290-157	Knowledge of light vehicle engine mechanical, lubrication and cooling system units and components	R/601/3719

City & Guilds unit number	Unit title	Unit accreditation number
4290-177	Knowledge of light vehicle fuel, ignition, air and exhaust system units and components	H/601/3725
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
4290-712	Introduction to vehicle workshop bench skills	A/600/4562
4290-713	Basics of vehicle body fitting	K/601/7291
4290-714	Basics of vehicle mechanical electrical trim	M/601/7292
4290-715	Fundamental vehicle body repair techniques	T/601/7293
4290-716	Introduction to vehicle MAG welding techniques	A/601/7294
4290-717	Introduction to vehicle resistance spot welding techniques	F/601/7295
4290-718	Introduction to vehicle panel preparation techniques	J/601/7296
4290-720	Application of paint materials to vehicles using spray gun techniques	R/601/7298
4290-721	Mix foundation coat materials for spray gun application	T/602/2039
4290-722	Vehicle hand skills and manufacturing techniques	R/600/5121
4290-723	Prepare vehicle body panels for foundation coat materials using masking materials and techniques	Y/602/2132

Unit 001

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

Level:	2
Credit value:	7
GLH	60
UAN:	Y/601/7254
Aim:	<p>This unit is about the skills required to</p> <ul style="list-style-type: none">• 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 workplace and complying with relevant legislation and good practice• work safely at all times within the automotive workplace, 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 environment
Assessment criteria	
The learner can:	
1.1	select and use personal protective equipment throughout activities. to include appropriate protection of: <ul style="list-style-type: none">a. eyesb. earsc. headd. skine. feetf. handsg. 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 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 026/076 Introduction to vehicle technology and workshop methods and processes

Level:	1
Credit value:	6
GLH	60
UAN:	L/502/1646
Aim:	This unit is about carrying out basic routine maintenance and carrying out adjustment or replacement activities of components during the maintenance activity.

Learning outcome	The learner will:
1.	be able to understand the operation and use of workshop equipment
Assessment criteria	
The learner can:	
1.1	identify and use common workshop equipment
1.2	state safety precautions and regular checks for the above

Learning outcome	The learner will:
2.	be able to understand the use of tools and measuring equipment; identify joining methods and materials
Assessment criteria	
The learner can:	
2.1	identify and use common hand tools
2.2	identify locking and securing devices
2.3	describe the principles of measurement
2.4	identify and use measuring equipment
2.5	identify materials and their properties
2.6	restore threads and remove broken studs

Learning outcome	The learner will:
3.	be able to understand basic electrical principles and basic use of test equipment
Assessment criteria	
The learner can:	
3.1	describe the principles of electricity and electrical circuits
3.2	identify and use electrical measuring equipment

Learning outcome	The learner will:
4.	be able to understand vehicle construction materials, components, methods and safety features
Assessment criteria	
The learner can:	
4.1	identify materials used in vehicle construction
4.2	identify the components used in vehicle construction
4.3	describe the types of vehicle chassis and different construction methods
4.4	describe the safety features used in vehicle construction
4.5	state current regulations controlling design, construction and use of vehicles.

Unit 026/076 Introduction to vehicle technology and workshop methods and processes

Unit content

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.

Workshop equipment

- a) inspection lamps
- b) trolley jacks
- c) axle stands
- d) ramps and wheel chocks
- e) single post lifts
- f) two post lifts
- g) four post lifts
- h) compressors and air lines
- i) oil drainage equipment
- j) tyre changing machines
- k) wheel balancing equipment
- l) edgreasing and cleaning equipment
- m) cranes, slings and chains
- n) pillar and hand held drills
- o) bench grinders
- p) battery chargers
- q) welding equipment (basics only)
- r) headlamp alignment

Safety precautions

Safety regulations:

- a) Health and Safety at Work Act
- b) COSHH
- c) RIDDOR

Hand tools

- a) files
- b) saws
- c) hammers
- d) pliers and grips
- e) screwdrivers
- f) drills and drill bits
- g) spanners
- h) punches and chisels

- i) air tools
- j) taps and dies
- k) holding equipment (vices etc.)
- l) sockets.

Locking and securing devices

- a) fixing devices
 - i. nuts
 - ii. bolts
 - iii. screws
 - iv. ties
 - v. rivets
- b) locking and securing devices
 - i. locking nuts
 - ii. split pins
 - iii. locking wire
 - iv. locking washers

Materials

- a) ferrous metals
- b) non ferrous metals
- c) steel
- d) aluminium
- e) brass
- f) copper
- g) lead
- h) cast iron
- i) plastic
- j) kevlar
- k) rubber
- l) carbon fibre
- m) safety glass

Properties

- a) ductility
- b) malleability
- c) hardness
- d) toughness
- e) strength
- f) elasticity
- g) conductivity

Principles

- a) symbols, switches, conductors, insulators and fuses
- b) Ohm's Law and the power equation
 - i. amps
 - ii. watts
 - iii. ohms
 - iv. volts
- c) series and parallel circuits
- d) production of electricity

- i. alternating current
- ii. direct current
- e) wiring diagrams
 - i. flow
 - ii. layout
 - iii. destination

Measuring equipment

- a) test lamp
- b) ammeter
- c) voltmeter
- d) ohmmeter

Components

- a) sills, wings and inner wings
- b) scuttle and valances
- c) doors, roof
- d) sub frames and assemblies
- e) spoilers and air dams
- f) wheel arches
- g) bonnet and boot panels
- h) door, bonnet and boot fixings

Vehicle chassis types and construction methods

- a) monocoque
- b) composite
- c) integral types
- d) commercial vehicle ladder and cruciform

Safety features

- a) crumple zones
- b) side impact protection
- c) bumpers
- d) safety glass
- e) seat belts and pre-tensioners
- f) air bags

Regulations

- a) MOT testing frequency of new unused vehicles
- b) minimum requirement for exterior vehicle lighting
- c) statutory standard setting bodies for the motor industry.

Unit 031

Skills to support working relationships in the automotive work environment

Level:	1
Credit value:	3
GLH	27
UAN:	Y/601/6265
Aim:	This unit is about the skills needed to develop and keep good working relationships with all colleagues in the workplace by using effective communication and support skills

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	show a prompt and willing response to requests from customers and colleagues in the work environment
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	identify, locate and use relevant information, in an automotive work environment.

Learning outcome	The learner will:
3.	be able to communicate with and support colleagues and customers 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	communicate with customers and colleagues clearly and courteously

Learning outcome	The learner will:
4.	be able to demonstrate good working relationships in the automotive work environment
Assessment criteria	
<p>The learner can:</p> <ul style="list-style-type: none"> 4.1 demonstrate positive team work within an automotive environment 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 identify and inform colleagues promptly of anything likely to affect their own work 	

Unit 051

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

Level:	2
Credit value:	3
GLH	30
UAN:	D/601/6171
Aim:	<p>This unit enables the learner to develop an understanding of:</p> <ul style="list-style-type: none">• routine maintenance and cleaning of the automotive environment and using resources economically• Health & 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 of 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

Unit content

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 e.g. 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. Power Presses Regulations 1992
- 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 Wheel Regulations
- i. Safe Working Loads
- j. Working at Height Regulations.

Routine maintenance of the workplace

- a. Trainees' 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 Health 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 personal, customers, contractors etc entering your 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 are outside your 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 policies 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. 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 081

Knowledge to support working relationships in the automotive work environment

Level:	1
Credit value:	3
GLH	28
UAN:	F/601/6180
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.	know key organisational structures, functions and roles within the automotive work environment
Assessment criteria	
The learner can:	
1.1	list the main sections which may be found within a typical automotive work environment.
1.2	outline typical organisational structures and lines of communication within an automotive work environment. to include: a. non franchised dealer b. franchised dealer
1.3	state typical levels of responsibility within specific job roles in an automotive work environment. to include a: a. trainee b. skilled technician c. supervisor

Learning outcome	The learner will:
2.	know 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	give examples of different sources of information and when they would be used within the automotive environment
2.2	give examples of the legal requirements relating to the use of a vehicle on the road, including safety requirements
2.3	state the importance of obtaining correct information and working to recognised procedures and processes
2.4	give examples of when replacement units and components must meet the original equipment specification
2.5	give examples of identification codes and how they are used.

Learning outcome	The learner will:
3.	know where different types of communication within the automotive work environment can be used
Assessment criteria	
The learner can:	
3.1	give examples of alternative methods of communication and where they could be used within the automotive environment.

Learning outcome	The learner will:
4.	know communication requirements when carrying out vehicle repairs in the automotive work environment
Assessment criteria	
The learner can:	
4.1	give examples of when it is important to communicate with a supervisor whilst carrying out repairs in the automotive environment
4.2	state the importance of keeping records of vehicle repair information
4.3	state why it is important to work to agreed timescales.

Learning outcome	The learner will:
5.	know how to develop good working relationships with colleagues and customers in the automotive workplace
Assessment criteria	
The learner can:	
5.1	outline how to develop positive working relationships with colleagues and customers
5.2	give examples of why it is important to accept other peoples' views and opinions within the workplace
5.3	state why it is important to make and honour realistic commitments to colleagues and customers.

Unit 081 Knowledge to support working relationships in the automotive work environment

Unit content

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.

Sections within a typical vehicle repair business

- a. Reception.
- b. Body shop.
- c. Service repair workshop.
- d. Valeting.
- e. Parts.
- f. Sales.
- g. Administration.

Different sources of information in an automotive work environment

- a. Other staff.
- b. Manuals.
- c. Parts lists.
- d. Computer software / internet.
- e. Manufacturer.
- f. Diagnostic equipment.

Locating and using correct documentation and information for:

- a. recording vehicle maintenance and repairs
- b. vehicle specifications
- c. component specifications
- d. oil and fluid specifications
- e. equipment and tools
- f. identification codes.

Alternative methods of communication

- a. Verbal.
- b. Signs and notices.
- c. Memos.
- d. Telephone.
- e. Electronic mail.
- f. Vehicle job card.
- g. Notice boards.
- h. SMS text messaging.

Communication with a supervisor

- a. Referral of problems.
- b. Reporting delays.
- c. Additional work identified during repair or maintenance.
- d. Keep others informed of progress.

Agreed timescales

- a. Relationship between time and cost.
- b. Customer expectation.

Unit 102

Skills in removing and fitting non permanently fixed motor vehicle body panels

Level:	2
Credit value:	2
GLH	20
UAN:	R/601/5454
Aim:	This unit will help the learner to develop the skills required to carry out a range of removal and fitting of non-permanently fixed vehicle panels such as wings, doors, bonnets, boot lids and tailgates. 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 non-permanently fixed vehicle panels
Assessment criteria	
The learner can:	
1.1	use suitable personal protective equipment and vehicle coverings throughout all 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 motor vehicle removal and recognised fitting activities including: <ul style="list-style-type: none">a. vehicle technical datab. removal and fitting proceduresc. legal requirements
2.2	use technical information to support motor vehicle removal and recognised fitting 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 removal and fitting of non-permanently fixed vehicle 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 non-permanently fixed vehicle panels

Learning outcome	The learner will:
4.	be able to carry out removal and fitting of non-permanently fixed vehicle panels
Assessment criteria	
The learner can:	
4.1	carry out removal and fitting of non-permanently fixed vehicle panels
4.2	carry out removal and fitting of non-permanently fixed vehicle panels adhering to the correct specifications and tolerances for the vehicle.
4.3	ensure that the removal and fitting of non-permanently fixed panels conforms to the vehicle operating specification and any legal requirements
4.4	ensure the components are realigned correctly in a way which regains their original manufactured tolerance
4.5	ensure no damage occurs to other components when removal and fitting of non-permanently fixed vehicle panels
4.6	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 107

Skills in removing and replacing light vehicle engine units and components

Level:	2
Credit value:	5
GLH	45
UAN:	K/601/3872
Aim:	This unit allows the learner to develop skills to 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: <ul style="list-style-type: none">a. vehicle technical datab. removal and replacement proceduresc. 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: <ul style="list-style-type: none"> 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 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 109/159 Valet vehicles

Level:	2
Credit value:	10
GLH	62
UAN:	L/501/3515
Aim:	This unit is about carrying out a full exterior and interior valet of vehicles, including hard and soft trim surfaces where relevant.

Learning outcome	The learner will:
1.	be able to understand the tools, equipment and materials for carrying out a vehicle valet.
Assessment criteria	
The learner can:	
1.1	explain the tools and equipment used for vehicle valets
1.2	explain the maintenance requirements for tools and equipment used for vehicle valets
1.3	explain the materials and fluids used for vehicle valets.

Learning outcome	The learner will:
2.	be able to understand legislative and organisational requirements for carrying out a vehicle valet.
Assessment criteria	
The learner can:	
2.1	explain the legal requirements relating to vehicle valets
2.2	explain health and safety requirements relating to vehicle valets
2.3	explain information relating to vehicle valets
2.4	explain the organisational requirements relating to vehicle valets.

Learning outcome	The learner will:
3.	be able to understand the procedures for conducting a vehicle valet.
Assessment criteria	
The learner can:	
3.1	explain the procedures and sequence for carrying out vehicle valets
3.2	explain the methods for restoring exterior paint work
3.3	describe how the customer requirements can be documented and met
3.4	explain the environmental requirements of vehicle valets
3.5	explain the selection and use of valet accessories
3.6	describe protective measures which can be used to prevent contamination of cleaned areas.

Learning outcome	The learner will:
	4. be able to safely and effectively carry out a vehicle valet.
Assessment criteria	
The learner can:	
4.1 select and use appropriate personal and vehicle protection equipments	
4.2 locate and use correct technical information to conduct vehicle valet	
4.3 correctly and safely carryout valet of vehicle exterior and interior	
4.4 record and report vehicle valet and any problems or delays	
4.5 dispose of waste materials and substances to conform to safety and environmental requirements.	

Unit 152

Knowledge of removing and fitting non permanently fixed motor vehicle body panels

Level:	2
Credit value:	2
GLH	20
UAN:	D/601/5425
Aim:	This unit will help the learner to develop the knowledge required to carry out a range of removal and fitting of non-permanently fixed vehicle panels such as wings, doors, bonnets, boot lids and tailgates. 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 non-permanently fixed motor vehicle body panels
Assessment criteria	
The learner can:	
1.1	identify the procedures involved in carry out the systematic removal and fitting of non-permanently fixed vehicle body panels: <ul style="list-style-type: none">a. wingsb. doorsc. bonnetsd. boot lidse. tailgates
1.2	identify the procedures involved in working with supplementary safety systems when fitting basic non-permanently fixed vehicle body panels
1.3	describe the methods and procedures for storing removed non-permanently fixed vehicle body panels
1.4	identify the different types of fastenings and fixings used when removing and fitting non-permanently fixed vehicle body panels
1.5	explain the reasons for the use of different types of fastenings and fixings used in non-permanently fixed vehicle body panels
1.6	describe the procedures, methods and reasons for ensuring alignment of non-permanently fixed vehicle body panels
1.7	identify the quality checks that can be used to ensure alignment and operation of non-permanently fixed vehicle body panels
1.8	identify conformity of vehicle systems against vehicle specification and legal requirements on completion
1.9	explain the procedure for reporting damage to vehicle non-permanently fixed vehicle body panels

Unit 157

Knowledge of Light Vehicle Engine Mechanical, Lubrication and Cooling System Units and Components

Level:	2
Credit value:	3
GLH	20
UAN:	R/601/3719
Aim:	This unit enables the learner to develop an understanding of the construction and operation of common engine mechanical, lubrication and cooling 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 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 <ol style="list-style-type: none">four strokespark ignitioncompression ignitionrotary
1.3	compare key light vehicle engine mechanical 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 mechanical systems <ol style="list-style-type: none">compression ratio'scylinder capacitypowertorque
1.5	state common terms used in light vehicle engine mechanical system design <ol style="list-style-type: none">tdcbdcstrokebore.

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 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> 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	
<p>The learner can:</p> <ul style="list-style-type: none"> 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 157 Knowledge of Light Vehicle Engine Mechanical, Lubrication and Cooling System Units and Components

Unit content

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 matrix's 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.
 - v The procedures used when inspecting:
 - vi internal heating system
 - vii 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 177

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

Level: 2

Credit value: 3

GLH 20

UAN: H/601/3725

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:
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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:
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4. understand how to check, replace and test light vehicle engine fuel system units and components
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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 system 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 177 Knowledge of light vehicle fuel, ignition, air and exhaust system units and components

Unit content

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:
 - i fuel filters
 - ii sedimenters
 - iii injectors
 - iv injector types (direct and indirect injection)
 - v single
 - vi multi-hole and pintle nozzle types
 - vii governors
 - viii fuel pipes
 - ix glow plugs
 - x cold start devices.
 - xi 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 (H₂O)
 - ii nitrogen (N)
 - iii carbon monoxide (CO)
 - iv carbon dioxide (CO₂)
 - v carbon (C)
 - vi hydrocarbon (HC)
 - vii oxides of nitrogen (NO_x, 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 of 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 218

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

Level:	2
Credit value:	3
GLH	20
UAN:	K/601/3869
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: <ul style="list-style-type: none">a. vehicle technical datab. removal and fitting proceduresc. 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	
The learner can:	
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 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 268

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

Level:	2
Credit value:	2
GLH	20
UAN:	F/601/3747
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 carry out the systematic removal and fitting of basic light vehicle met components to the standard required including: <ul style="list-style-type: none">a. bumpersb. headlamp unitsc. road wheelsd. batteriese. bonnet and boot trimf. interior trim componentsg. 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 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: <ul style="list-style-type: none"> 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

Level:	Entry Level 3
Credit value:	4
GLH	26
UAN:	A/600/4562
Aim:	This unit is an introduction to the vehicle workshop bench skills needed to work in the automotive maintenance and repair industry.

Learning outcome	The learner will:
1.	be able to follow approved and safe procedures when working on engine systems
Assessment criteria	
The learner can:	
1.1	correctly use required ppe
1.2	follow approved workplace procedures
1.3	identify potential health and safety hazards and risks
1.4	identify the relevant information sources
1.5	state the importance of keeping records

Learning outcome	The learner will:
2.	be able to carry out vehicle workshop bench skill techniques
Assessment criteria	
The learner can:	
2.1	identify the correct equipment and check it is fit for purpose
2.2	correctly use equipment
2.3	state why materials properties are important
2.4	draw simple sketches
2.5	carry out vehicle workshop bench skills and manufacturing techniques

Unit 712 Vehicle workshop bench skills

Unit content

This unit can be adapted to suit a range of vehicle and engine types.

- Light vehicle
- Heavy vehicle
- Motorcycle
- Quad bike
- Horticulture vehicles

It is important that candidates have a good understanding of:

- sketches and simple engineering drawings
- how to use tools and equipment correctly and safely
- how to carry out manufacturing techniques using bench skills

Range

Approved workplace procedures

safely handle and dispose of used and waste components, and fluids
safely start and run engines in a confined space

Tools and equipment

hand tools, centre punch, measuring equipment, specialist, hammer, files, taps, dies, drills, vice

Bench skills and manufacturing techniques

joining techniques, making threads, cutting metals, measuring, bending, folding, filing

Simple sketches

dimensions, materials, joining, thread

Level:	Entry Level 3
Credit value:	4
GLH	38
UAN:	K/601/7291
Aim:	This unit is about demonstrating the skills and knowledge required to remove and refit vehicle body components that are fixed using threaded fasteners. Learners will carry out adjustments as instructed, and with appropriate support and guidance take some responsibility for the outcomes of the activities.

Learning outcome	The learner will:
	1. be able to follow approved and safe procedures when removing and refitting detachable vehicle body panels
Assessment criteria	
The learner can:	
1.1 correctly use required ppe follow approved workplace procedures	
1.2 follow approved workplace procedures	
1.3 identify potential health and safety hazards and risks	
1.4 identify the relevant information sources	
1.5 state the importance of keeping records.	

Learning outcome	The learner will:
	2. be able to carry out the removal and replacement of detachable vehicle body components
Assessment criteria	
The learner can:	
2.1 identify the correct hand tools and check they are fit for purpose	
2.2 correctly use hand tools	
2.3 identify vehicle body panels using the correct terminology	
2.4 correctly align detachable vehicle body components	
2.5 identify the different types of fasteners	
2.6 securely fix detachable vehicle body components	
2.7 follow prescribed quality checks to ensure correct alignment and secure fixing.	

Unit 713 Basics of vehicle body fitting

Unit content

For this unit: approved and safe workplace procedures should include:

- Minimising the risk of damage to self and others and their property, the vehicle, its systems, the environment.
- Complying with good housekeeping practices and correctly store workshop hand tools during and after use.

Detachable vehicle body components should include:

- bonnets
- doors
- tailgates
- bolt on wings.

Fasteners and fixings should include:

- hexagonal head bolts
- nuts; plain hexagonal
- washers; plain and spring.

Hand tools should include:

- spanners; open end, ring and combination
- ratchet, strong bar, sockets and extension bars
- screwdrivers; cross point and plain.

Approved and safe workplace procedures

- work in a way which minimises the risk of damage to self and others and their property, the vehicle, its systems, the environment.
- comply with good housekeeping practices and correctly store workshop hand tools during and after use

Unit 714

Basics of vehicle mechanical electrical trim (MET)

Level:	Entry Level 3
Credit value:	4
GLH	36
UAN:	M/601/7292
Aim:	This unit is about demonstrating the skills and knowledge required to remove and refit vehicle mechanical, electrical and trim components. Learners will carry out adjustments as instructed, and with appropriate support and guidance take some responsibility for the outcomes of the activities.

Learning outcome	The learner will:
1.	be able to follow approved and safe procedures when removing and refitting detachable vehicle body panels
Assessment criteria	
The learner can:	
1.1	correctly use required ppe
1.2	follow approved workplace procedures
1.3	identify potential health and safety hazards and risks
1.4	identify the relevant information sources.
1.5	state the importance of keeping records

Learning outcome	The learner will:
2.	be able to remove and replace met components
Assessment criteria	
The learner can:	
2.1	identify the correct hand tools and check they are fit for purpose
2.2	correctly use hand tools
2.3	identify the different types of vehicle
2.4	identify vehicle met components using the correct terminology
2.5	correctly align met components.
2.6	identify the different types of fasteners
2.7	securely fix detachable vehicle body components
2.8	follow prescribed quality checks to ensure correct alignment and secure fixing.

Unit 714 Basics of vehicle mechanical electrical trim (MET)

Unit content

For this unit: approved and safe workplace procedures should include:

- Minimising the risk of damage to self and others, their property, the vehicle, its systems, the environment.
- Complying with good housekeeping practices and correctly storing workshop hand tools during and after use.

MET components should include:

- Bumpers front and rear
- Rear lamps
- Front grille/trim
- Road wheel

Fasteners and fixings should include:

- Hexagonal head bolts
- Nuts; plain hexagonal, wheel lock and plastic insert (nyloc)
- Washers; plain and spring
- Trim clips

Tools and equipment should include:

- Spanners; open end, ring and combination
- Ratchet, strong bar, sockets and extension bars
- Screwdrivers; cross point and plain
- Torque wrench
- Vehicle jacks
- Axle stands
- Wheel brace
- Wheel chocks

Types of vehicle should include:

- Saloon, hatchback, sports, estate.

Unit 715

Fundamental vehicle body repair techniques

Level:	Entry Level 3
Credit value:	4
GLH	38
UAN:	T/601/7293
Aim:	This unit is about demonstrating the skills and knowledge required to; complete preliminary vehicle body repair activities, identify the materials used, and with appropriate guidance take some responsibility for the quality of the work.

Learning outcome	The learner will:
1.	be able to follow approved and safe procedures when carrying out preliminary body panel repairs
Assessment criteria	
The learner can:	
1.1	correctly use required ppe
1.2	follow approved workplace procedures
1.3	identify potential health and safety hazards and risks
1.4	identify the relevant information sources.
1.5	state the importance of keeping records.

Learning outcome	The learner will:
2.	be able to carry out body repair techniques
Assessment criteria	
The learner can:	
2.1	identify the correct hand and power tools and check they are fit for purpose
2.2	correctly use hand and power tools
2.3	identify the panel/substrate material
2.4	rough out small dents using a variety of hand tools
2.5	mix and apply plastic body filler in an economical manner
2.6	rub down body filler to the correct profile
2.7	follow prescribed quality checks to ensure acceptable profile of repair.

Unit 715 Fundamental vehicle body repair techniques

Unit content

For this unit: approved and safe workplace procedures should include:

- Minimising the risk of damage to self and others, their property, the vehicle, its systems, the environment.
- Complying with good housekeeping practices and correct storage of workshop tools and equipment during and after use.

Repair techniques should include:

- roughing out of small dents using a selection of hand tools.
- repairing small dents using body filler
- flattening body fillers

Materials should include:

- carbon steels
- plastic body filler
- flattening papers

Hand tools should include:

- hammers
- dollies
- filler applicators
- flattening blocks

Power tools should include:

- sanders; disc, and DA.

Unit 716

Introduction to vehicle MAG welding techniques

Level:	Entry Level 3
Credit value:	3
GLH	30
UAN:	A/601/7294
Aim:	This unit is about the skills and knowledge required to; use MAG welding equipment to complete plug and lap welds in low carbon steel sheet (0.75 – 1mm), and carry out operational adjustments on the equipment.

Learning outcome	The learner will:
	1. be able to follow approved and safe procedures when using mag welding equipment
Assessment criteria	
The learner can:	
1.1 state the health and safety requirements relevant to electric welding principles	
1.2 correctly use required ppe	
1.3 follow approved workplace procedures	
1.4 identify potential health and safety hazards and risks	
1.5 identify the relevant information sources	
1.6 state the importance of keeping records.	

Learning outcome	The learner will:
	2. be able to produce mag plug and lap welds
Assessment criteria	
The learner can:	
2.1 complete effective tacking of materials prior to lap and plug welding.	
2.2 complete effective lap welds	
2.3 complete effective plug welds.	

Learning outcome	The learner will:
	3. know the principles and techniques of using mag welding processes.
Assessment criteria	
The learner can:	
3.1 state why it is important to use correct mag welding techniques	
3.2 state the purpose of the shielding gas	
3.3 identify distortion caused by the application of heat.	

Unit 716 Introduction to vehicle MAG welding techniques

Unit content

For this unit: approved and safe workplace procedures should include

- Minimising the risk of damage to self and others, their property, the vehicle, its systems, the environment.
- Complying with good housekeeping practices and correct storage of workshop tools and equipment during and after use

Health and safety hazards and risks associated with MAG welding would include:

- heat
- fire
- burns
- ultra violet rays
- fumes
- arc eye
- spatter

Effective welds

- When destructive testing is applied to effective welds the material will fail before the weld. The aesthetics of the weld is therefore of secondary importance.

Materials

- Lap weld approximately 100mm x 60mm x 0.75mm – 1mm mild steel. With a length of 30mm and a pitch of 30mm.
- Plug weld on material 150mm x 60mm x 0.75mm – 1mm mild steel using three plugs approximately 12mm in diameter over the length of material
- All dimensions, length and pitch provided are for guidance only and may be modified to suit the local situation.

For this unit welding techniques should include guidance on:

- torch angle inclination
- direction of torch travel
- speed of torch travel
- distance of torch from work piece
- tacking prior to welding
- preparation of material prior to welding
- cleaning and presentation of material post welding
- cleaning and presentation of MAG welding equipment post welding.

Unit 717

Introduction to vehicle resistance spot welding techniques

Level:	Entry Level 3
Credit value:	2
GLH	18
UAN:	F/601/7295
Aim:	This unit is about the skills and knowledge required to; set up and use resistance spot welding equipment, complete sample welds in low carbon steel sheet (0.75 – 1mm) and carrying out destructive testing.

Learning outcome	The learner will:
1.	be able to follow approved and safe procedures when setting up and using resistance spot welding equipment
Assessment criteria	
The learner can:	
1.1	state the health and safety requirements relevant to electric welding principles.
1.2	correctly use required ppe
1.3	follow approved workplace procedures
1.4	identify potential health and safety hazards and risks
1.5	identify the relevant information sources
1.6	state the importance of keeping records.

Learning outcome	The learner will:
2.	be able to carry out resistance spot welding
Assessment criteria	
The learner can:	
2.1	set up resistance spot welding equipment to include: a. welding arms b. welding tips
2.2	adjust resistance spot welding equipment to include: a. the voltage b. timer mechanisms
2.3	prepare materials for resistance spot welding
2.4	complete resistance spot welding
2.5	complete destructive testing on resistance spot welds.

Learning outcome	The learner will:
3.	understand the principles and techniques of resistance spot welding processes
Assessment criteria	
The learner can:	
3.1	list the variables of resistance spot welding
3.2	state the methods used to check the effectiveness of resistance spot welds
3.3	identify distortion caused by the application of heat

Unit 717

Introduction to vehicle resistance spot welding techniques

Unit content

For this unit: approved and safe workplace procedures should include:

- Minimising the risk of damage to self and others, their property, the vehicle, its systems, the environment.
- Complying with good housekeeping practices and correct storage of workshop tools and equipment during and after use

Health and safety hazards and risks associated with resistance spot welding would include:

- heat
- fire
- burns
- fumes
- spatter

Materials

- All dimensions (approx 100mm x 25mm x 0.75 - 1 mm) are for guidance only and may be modified to suit the local situation.

Variables of resistance spot welding

- heat
- pressure
- time

Unit 718

Introduction to vehicle panel preparation techniques

Level: Entry Level 3

Credit value: 3

GLH 28

UAN: J/601/7296

Aim: This unit is about demonstrating the skills and knowledge required to prepare vehicle body panels for subsequent paint coats while working under clear guidelines.

Learning outcome	The learner will:
1.	be able to follow approved and safe procedures when preparing vehicle body panels
Assessment criteria	
The learner can:	
1.1	correctly use required ppe
1.2	follow approved workplace procedures
1.3	identify potential health and safety hazards and risks
1.4	identify the relevant information sources
1.5	state the importance of keeping records.

Learning outcome	The learner will:
2.	be able to prepare vehicle body panels
Assessment criteria	
The learner can:	
2.1	identify the correct hand, power tools and equipment and check they are fit for purpose
2.2	correctly use hand, power tools and equipment
a.	hand flat vehicle body panels
b.	flat vehicle body panels using power tools
c.	feather edge a repaired body panel
2.3	clean tools and equipment and obtain confirmation that that they are left in a clean and serviceable condition.

Learning outcome	The learner will:
3.	know the materials used in vehicle body panel preparation.
Assessment criteria	
The learner can:	
3.1	identify the types and grades of abrasive materials used for vehicle body panel preparation
3.2	list the different types of paint material
3.3	list the different types of paint coat.

Unit 718

Introduction to vehicle panel preparation techniques

Unit content

For this unit: approved and safe workplace procedures should include:

- Minimising the risk of damage to self and others their property, the vehicle, its systems, the environment including the disposal of waste materials.
- Complying with good housekeeping practices and correct storage of workshop tools and equipment during and after use.

Hand tools should include:

- flattening blocks.

Power tools and equipment should include:

- power sanders, pneumatic and electric
- dust extraction equipment
- airlines and power leads.

Abrasive materials should include:

- scouring pads
- lapping papers.

Paint materials should include:

- thinners, activators, primers and undercoats.

Paint coats should include:

- primers and undercoats.

Unit 720

Application of paint materials to vehicles using spray gun techniques

Level:	Entry Level 3
Credit value:	3
GLH	28
UAN:	R/601/7298
Aim:	In this unit learners will be able to demonstrate the skills and knowledge required to apply foundation coat materials using a previously prepared and set spray gun.

Learning outcome	The learner will:
1.	be able to follow approved and safe procedures when applying foundation coat materials.
Assessment criteria	
The learner can:	
1.1 correctly use required ppe	
1.2 follow approved workplace procedures	
1.3 identify potential health and safety hazards and risks	
1.4 identify the relevant information sources	
1.5 state the importance of keeping records	
1.6 state the need for fume extraction when applying foundation coat materials.	

Learning outcome	The learner will:
2.	be able to apply foundation coat materials.
Assessment criteria	
The learner can:	
2.1 use a pre-prepared spray gun to apply foundation coat materials	
2.2 identify the correct spray gun pattern	
2.3 clean tools and equipment and obtain confirmation that that they are left in a clean and serviceable condition.	

Unit 720

Application of paint materials to vehicles using spray gun techniques

Unit content

For this unit: approved and safe workplace procedures should include:

- Minimising the risk of damage to self and others their property, the vehicle, its systems, the environment including the disposal of waste materials.
- Complying with good housekeeping practices, maintaining a clean working environment and correct storage of workshop tools and equipment during and after use.

For this unit foundation coat materials should include:

- etch primers, primers
- thinners
- activators

Unit 721

Mix foundation coat materials for spray gun application

Level:	Entry Level 3
Credit value:	2
GLH	18
UAN:	T/602/2039
Aim:	In this unit learners will be able to demonstrate the skills and knowledge required to mix foundation coat materials for application by spray gun.

Learning outcome	The learner will:
1.	be able to follow approved and safe procedures when preparing vehicle body panels.
Assessment criteria	
the learner can:	
1.1	correctly use required ppe
1.2	follow approved workplace procedures
1.3	identify potential health and safety hazards and risks
1.4	state the importance of controlling paint shop substances which may be hazardous to health
1.5	identify the relevant information sources
1.6	state the importance of keeping records.

Learning outcome	The learner will:
2.	be able to mix foundation coat materials.
Assessment criteria	
the learner can:	
2.1	use pre-selected technical information to support the mixing of foundation coat materials
2.2	use hand tools for mixing foundation coat materials
2.3	use measuring equipment for mixing foundation coat materials
2.4	mix foundation coat materials
2.5	clean tools and equipment and obtain confirmation that that they are left in a clean and serviceable condition.

Unit 721 Mix foundation coat materials for spray gun application

Unit content

For this unit: approved and safe workplace procedures should include:

- Minimising the risk of damage to self and others their property, the vehicle, its systems, the environment including the disposal of waste materials.
- Complying with good housekeeping practices and correct storage of workshop tools and equipment during and after use.

Hand tools should include:

- mixing sticks
- measuring sticks
- mixing containers

Foundation coat materials should include:

- etch primers and primers.
- thinners
- activators

Unit 722

Vehicle hand skills and manufacturing techniques

Level:	1
Credit value:	4
GLH	28
UAN:	R/600/5121
Aim:	This unit is about demonstrating the skills and knowledge required to carry out vehicle hand skills and manufacturing techniques.

Learning outcome	The learner will:
1.	know legislative and organisational requirements
Assessment criteria	
The learner can:	
1.1	describe and demonstrate the manufacturers and legal requirements relating to vehicle hand skills and manufacturing techniques.
1.2	ensure the legal requirements relating to the activity are maintained
1.3	demonstrate the health and safety legislation and workplace procedures relevant to vehicle hand skills and manufacturing techniques including personal protective equipment
1.4	demonstrate and describe workplace procedures for <ol style="list-style-type: none">handling and disposal of used lubricantshandling and disposal of waste metals
1.5	work in a way which minimises the risk of damage to the vehicle, its systems, other people and their property.
1.6	demonstrate that they have shown an awareness of education for sustainable development and global citizenship

Learning outcome	The learner will:
	2. know how to locate and use relevant sources of information
Assessment criteria	
The learner can:	
2.1 ensure their records are accurate for	
a. specification	
b. maintenance information	
c. dimensions	
d. materials	
e. equipment	
2.2 demonstrate the importance of following correct technical data for vehicle hand skills and manufacturing techniques	
2.3 demonstrate the importance of working to agreed timescales and keeping others informed of progress.	

Learning outcome	The learner will:
	3. understand how to carry vehicle hand skills and manufacturing techniques
Assessment criteria	
The learner can:	
3.1 describe and illustrate vehicle hand skills and manufacturing techniques for	
a. joining techniques	
b. making threads	
c. cutting metals	
d. measuring	
e. filing	
3.2 describe the importance of using correct materials for carrying out vehicle hand skills and manufacturing techniques	
3.3 illustrate examples of understanding simple engineering drawings for	
a. dimensions	
b. materials	
c. joining	
d. threads	

Learning outcome	The learner will:
4.	know how to select and use the appropriate tools and equipment to carry out the activity
Assessment criteria	
The learner can:	
4.1	describe and demonstrate how to prepare, test and use all the equipment required for carrying out vehicle hand skills and manufacturing techniques <ul style="list-style-type: none"> a. general hand tools b. files c. taps d. dies e. hammer f. drills g. vice h. centre punch i. micrometer j. rule

Learning outcome	The learner will:
5.	know how to carry vehicle hand skills and manufacturing techniques
Assessment criteria	
The learner can:	
5.1	illustrate they are able to understand basic engineering drawings for <ul style="list-style-type: none"> a. dimensions b. materials c. joining d. threads
5.2	demonstrate the correct procedure for manufacturing a simple vehicle service tool using techniques of <ul style="list-style-type: none"> a. making threads b. cutting metals c. measuring d. joining e. filing
5.3	demonstrate and use all the equipment required to carrying out vehicle hand skills and manufacturing techniques <ul style="list-style-type: none"> a. general hand tools b. files c. taps d. dies e. hammer f. drill g. vice h. centre punch i. micrometer j. rule

Unit 722

Vehicle hand skills and manufacturing techniques

Unit content

This unit can be adapted to suit a range of vehicle and engine types.

- light vehicle
- heavy vehicle
- motorcycle
- quad bike
- horticulture vehicles

It is important that candidates have a good understanding of:

- basic engineering drawings
- how to use tools and equipment safely
- how to manufacture a simple tool
- how to carry out the hand skills and techniques

Examples of tools which can be manufactured by candidates which include all the skills and equipment needed to undertaking this unit are:

- brake pipe clamp
- pad saw
- flywheel locking tool
- bearing puller
- vice clamp

Drawing may be available from the awarding body

Unit 723

Prepare vehicle body panels for foundation coat materials using masking materials and techniques

Level:	Entry Level 3
Credit value:	4
GLH	36
UAN:	Y/602/2132
Aim:	This unit is about demonstrating the skills and knowledge required to prepare vehicles for foundation coat materials using masking materials and techniques.

Learning outcome	The learner will:
1.	be able to follow approved and safe procedures when applying masking methods.
Assessment criteria	
The learner can:	
1.1	correctly use required ppe
1.2	follow approved workplace procedures
1.3	identify potential health and safety hazards and risks
1.4	identify the relevant information sources
1.5	state the importance of keeping records

Learning outcome	The learner will:
2.	be able to use masking materials and techniques to prepare vehicle body panels for foundation coat materials.
Assessment criteria	
The learner can:	
2.1	use suitable masking materials to mask up vehicle parts and components
2.2	mask vehicle parts and components
2.3	remove masking materials after foundation coat application
2.4	use suitable masking materials to mask up vehicle parts and components.

Learning outcome	The learner will:
3.	understand the methods and techniques used in masking up vehicle panels and components.
Assessment criteria	
<p>The learner can:</p> <ol style="list-style-type: none"> 3.1 list the materials used to mask vehicle parts and components: <ol style="list-style-type: none"> a. masking tape b. masking paper c. plastic masking sheets 3.2 state the importance of accurate application of masking materials 3.3 state the importance of using the correct masking material for the application 3.4 remove masking materials without damaging the vehicle 3.5 state the importance of timely removal of masking materials. 	



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.

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 (from September 2010).



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.

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
- **Qualifications and Credit Framework (QCF):** general guidance about the QCF and how qualifications will change, as well as information on the IT systems needed and FAQs
- **Events:** dates and information on the latest Centre events
- **Online assessment:** information on how to register for GOLA/e-volve assessments.

Centre Guide – Delivering International Qualifications 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. Specifically, the document includes sections on:

- The centre and qualification approval process and forms
- Assessment, verification and examination roles at the centre
- Registration and certification of candidates
- Non-compliance
- Complaints and appeals
- Equal opportunities
- Data protection
- Frequently asked questions.

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, GOLLA, 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

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