



Level 2 Technical Certificate in Automotive (4292-21)

September 2024 Version 8.0

Qualification Handbook

Qualification at a glance

Industry area	Automotive
City & Guilds number	4292-21
Age group approved	16-18 (Key Stage 5), 19+
Entry requirements	Centres must ensure that any pre-requisites stated in the <i>What is this qualification about?</i> section are met.
Assessment	To gain this qualification, candidates must successfully achieve the following assessments: <ul style="list-style-type: none"> • One externally set, externally moderated assignment • One externally set, externally marked exam, sat under examination conditions
Additional requirements to gain this qualification	Employer involvement in the delivery and/or assessment of this qualification is essential for all candidates and will be externally quality assured.
Grading	This qualification is graded Pass/Merit/Distinction/Distinction* For more information on grading, please see Section 7: Grading.
Approvals	These qualifications require full centre and qualification approval
Support materials	Sample assessments Guidance for delivery Guidance on use of marking grids
Registration and certification	Registration and certification of this qualification is through the Walled Garden, and is subject to end dates.
External quality assurance	This qualification is externally quality assured by City & Guilds, and its internally marked assignments are subject to external moderation. There is no direct claim status available for this qualification.

Title and level	Size (GLH)	TQT	City & Guilds qualification number	Ofqual accreditation number
Level 2 Technical Certificate in Automotive	360	600	4292-21	601/4528/6

Version and Date	Change Detail	Section
June 2017 V6.0	Addition of the examination paper based module number	1. Introduction – Assessment requirements and employer involvement 5. Assessment 5. Assessment – exam Specification 7. Grading – Awarding grades and reporting results
	Removal of AO 6-8 from Synoptic Assignments	5. Assessment – Assessment Objectives
	Addition of Provisional Grade Boundaries for the Synoptic Assignment	7. Grading
	Revised Exam Specification, Exam Duration and AO weightings	5. Assessment – Exam Specification
	Branding Changes	Throughout
October 2019 v7.0	Grade Boundary Synoptic Assignment	7. Grading
September 2024 v8.0	Removal of evolve onscreen exam option (022)	Assessment requirements and employer involvement

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1 Introduction

What is this qualification about?

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

Area	Description
OVERVIEW	
Who is this qualification for?	This qualification is for you if you are a 16 - 19 year old learner who is interested in a career in the automotive industry working on any type of vehicles such as: cars, motorcycles, trucks, vans or quads.
What does this qualification cover?	<p>You will study both the practical and theoretical aspects of the automotive industry such as:</p> <ul style="list-style-type: none">• The sectors the automotive industry consists of, the different career paths available, job roles and requirements.• The basic business skills required to run a workshop efficiently by using a range of marketing, sales and operational techniques.• How to produce invoices for repairs and explain them to the customer.• Engine types, their working principles and the importance of their location within the vehicle.• The vehicle chassis systems and how they operate, that is, braking, steering and suspension systems.• How to carry out vehicle inspections and follow service procedures safely as well as carrying out valeting activities.• Removal and replacement of Fast-Fit systems and components.• Use of automotive tools and joining equipment for cutting, threading, measuring and marking out.• Interpretation of engineering drawings for automotive service and repair.• The electrical and electronic systems that can be found in a vehicle, their principles and testing methods. <p>Centres and providers work with local employers who will contribute to the knowledge and delivery of the skills required. Employers will provide demonstrations and talks about the industry and where possible work placements will also be provided by the employers. This qualification is ideal preparation for gaining employment in the automotive industry or for further specialist study.</p>

WHAT COULD THIS QUALIFICATION LEAD TO?

Will the qualification lead to employment, and if so, in which job role and at what level?

The qualification will provide you with the basic training to start an Apprenticeship as a:

- Service Technician on your vehicle of choice (such as: cars, vans, motorcycles, trucks).
- Fast Fit Technician.

In addition, it will open up opportunities for you to understand and progress into other non-technical areas in the Retail Motor Industry such as sales or vehicle parts.

Why choose this qualification over similar qualifications?

There are no other qualifications within this suite at this Level for this age group.

Will the qualification lead to further learning?

You may wish to progress onto an Apprenticeship in Vehicle Maintenance and Repair on your vehicle of choice, which allows you to combine working at a manufacturer, dealership or independent garage with typically attending one day a week at college or with a training provider.

You may also decide to progress into further learning by taking up one of the following qualifications:

- City & Guilds Level 3 Advanced Technical Certificate in the Automotive Industry
- City & Guilds Level 3 Advanced Technical Extended Diploma in the Automotive Industry (720)

WHO SUPPORTS THIS QUALIFICATION?

Employer/Higher Education Institutions

This qualification is supported by The Society of Motor Manufacturers & Traders (SMMT), who exist to support and promote the interests of the UK automotive manufacturing industry at home and abroad.

Qualification structure

For the **Level 2 Technical Certificate in Automotive** the teaching programme must cover the content detailed in the structure below:

Level 2 Technical Certificate in Automotive		
City & Guilds unit number	Unit title	GLH
201	Automotive Health and Safety	30
202	Automotive Industry and Careers	30
203	Servicing and Inspection	30
204	Automotive Fast-Fit Systems	30
205	Vehicle Chassis Systems	30
206	Costing Workshop Repairs	30
207	Using Practical Tools	30
208	Vehicle Engines	30
209	Automotive Electronics	30
210	Automotive Transmission	30
211	Vehicle Valeting	30
212	Automotive Business	30

Total qualification time (TQT)

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

Title and level	GLH	TQT
Level 2 Technical Certificate in Automotive	360	600

Assessment requirements and employer involvement

To achieve the **Level 2 Technical Certificate in Automotive** candidates must successfully complete **both** mandatory assessment components.

Component number	Title
Mandatory	
023	Level 2 Automotive - Synoptic assignment (1)*
522	Level 2 Automotive - Theory exam (1)*

Note – from 1 September 2023, centres may only enter candidates for the Level 2 Automotive - Theory exam assessment through the paper-based component (522). There is no option to take this assessment as an onscreen (evolve) exam.

Where candidates have previously successfully achieved an onscreen exam - the result will continue to count towards the Rules of Combination for this qualification.

In addition, candidates **must** achieve the mandatory employer involvement requirement for this qualification **before** they can be awarded a qualification grade. For more information, please see guidance in *Section 4: Employer involvement*.

Employer involvement

Component number	Title
Mandatory	
821	Employer involvement

**Number of mandatory assessments per assessment type*

2 Centre requirements

Approval

New centres will need to gain centre approval. Existing centres who wish to offer this qualification must go through City & Guilds' **full** Qualification Approval Process. There is no fast track approval for this qualification. Please refer to the City & Guilds website for further information on the approval process: www.cityandguilds.com

Resource requirements

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

Centre staffing

Staff delivering this qualification must be able to demonstrate that they meet the following requirements:

- be technically competent in the areas in which they are delivering
- be able to deliver across the breadth and depth of the content of the qualification being taught
- have recent relevant teaching and assessment experience in the specific area they will be teaching, or be working towards this
- demonstrate continuing CPD.

Physical resources

Centres must be able to demonstrate that they have access to the equipment and technical resources required to deliver this qualification and its assessment.

Internal Quality Assurance

Internal quality assurance is key to ensuring accuracy and consistency of tutors and markers. Internal Quality Assurers (IQAs) monitor the work of all tutors involved with a qualification to ensure they are applying standards consistently throughout assessment activities. IQAs must have, and maintain, an appropriate level of technical competence and be qualified to make both marking and quality assurance decisions through a teaching qualification or recent, relevant experience.

Learner entry requirements

Centres must ensure that all learners have the opportunity to gain the qualification through appropriate study and training, and that any prerequisites stated in the *What is this qualification about?* section are met when registering on this qualification.

Age restrictions

This qualification is approved for learners aged 16 – 18, 19+.

3 Delivering technical qualifications

Initial assessment and induction

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

- if the learner has any specific learning or training needs,
- support and guidance they may need when working towards their qualification,
- the appropriate type and level of qualification.

We recommend that centres provide an introduction so that learners fully understand the requirements of the qualification, their responsibilities as a learner, and the responsibilities of the centre. This information can be recorded on a learning contract.

Employer involvement

Employer involvement is essential to maximise the value of each learner's experience. Centres are required to involve employers in the delivery of technical qualifications at Key Stage 5 and/or their assessment, for every learner. This must be in place or planned before delivery programmes begin in order to gain qualification approval. See *Section 4: Employer involvement* for more detail.

Support materials

The following resources are available for this qualification:

Description	How to access
Sample assessments	
Guidance for delivery	Available 2016 on the qualification pages on the City & Guilds
Guidance on use of marking grids	Website: www.cityandguilds.com

4 Employer involvement

Employer involvement is a formal component of Key Stage 5 Technical qualifications. It does not contribute to the overall qualification grading, but is a mandatory requirement that all learners must meet. As such it is subject to external quality assurance by City & Guilds.

Department for Education (DfE) requirements state:

Employer involvement in the delivery and/or assessment of technical qualifications provides a clear 'line of sight' to work, enriches learning, raises the credibility of the qualification in the eyes of employers, parents and students and furthers collaboration between the learning and skills sector and industry.

[Technical qualifications] must:

- *require all students to undertake meaningful activity involving employers during their study; and*
- *be governed by quality assurance procedures run by the awarding organisation to confirm that education providers have secured employer involvement for every student.*

Extract from: ***Vocational qualifications for 16 to 19 year olds, 2017 and 2018 performance tables: technical guidance for awarding organisations, paragraphs 89-90***

City & Guilds will provide support, guidance and quality assurance of employer involvement.

Qualification approval

To be approved to offer City & Guilds technicals, centres must provide an Employer Involvement planner and tracker showing how every learner will be able to experience meaningful employer involvement, and from where sufficient and suitable employer representatives are expected to be sourced.

Centres must include in their planer a sufficient range of activities throughout the learning programme that provide a range of employer interactions for learners. Centres must also plan contingencies for learners who may be absent for employer involvement activities, so that they are not disadvantaged. As part of the approval process, City & Guilds will review this planner and tracker. Centres which cannot show sufficient commitment from employers and/or a credible planner and tracker will be given an action for improvement with a realistic timescale for completion. **Approval will not be given** if employer involvement cannot be assured either at the start of the qualification, or through an appropriate plan of action to address this requirement before the learner is certificated.

Monitoring and reporting learner engagement

Employer involvement is a formal component of this qualification and is subject to quality assurance monitoring. Centres must record evidence that demonstrates that each learner has been involved in meaningful employer based activities against the mandatory content before claiming the employer involvement component for learners.

Centres must record the range and type of employer involvement each learner has experienced and submit confirmation that all learners have met the requirements to City & Guilds. If a centre cannot provide evidence that learners have met the requirements to achieve the component, then the learner will not be able to achieve the overall Technical Qualification.

Types of involvement

Centres should note that to be eligible, employer involvement activities **must** relate to one or more elements of the mandatory content of this qualification.

As the aim of employer involvement is to enrich learning and to give learners a taste of the expectations of employers in the industry area they are studying, centres are encouraged to work creatively with local employers.

Employers can identify the areas of skills and knowledge in their particular industry that they would wish to see emphasised for learners who may apply to work with them in the future. Centres and employers can then establish the type of input, and which employer representative might be able to best support these aims.

To be of most benefit this must add to, rather than replace the centre's programme of learning.

Some examples of meaningful employer involvement are listed below. Employer involvement not related to the mandatory element of the qualification, although valuable in other ways, does not count towards this element of the qualification.

The DfE has provided the following examples of what does and does not count as meaningful employer involvement, as follows^{1,2}:

The following activities meet the requirement for meaningful employer involvement:

- *students undertake structured work-experience or work-placements that develop skills and knowledge relevant to the qualification³;*
- *students undertake project(s), exercises(s) and/or assessments/examination(s) set with input from industry practitioner(s);*
- *students take one or more units delivered or co-delivered by an industry practitioner(s). This could take the form of master classes or guest lectures;*
- *industry practitioners operate as 'expert witnesses' that contribute to the assessment of a student's work or practice, operating within a specified assessment framework. This may be a specific project(s), exercise(s) or examination(s), or all assessments for a qualification.*

In all cases participating industry practitioners and employers must be relevant to the industry sector or occupation/occupational group to which the qualification relates.

The following activities, whilst valuable, do not meet the requirement for meaningful employer involvement:

- *employers' or industry practitioners' input to the initial design and content of a qualification;*
- *employers hosting visits, providing premises, facilities or equipment;*
- *employers or industry practitioners providing talks or contributing to delivery on employability, general careers advice, CV writing, interview training etc;*
- *student attendance at career fairs, events or other networking opportunities;*
- *simulated or provider-based working environments eg hairdressing salons, florists, restaurants, travel agents, small manufacturing units, car servicing facilities;*
- *employers providing students with job references.*

¹ As extracted from: Vocational qualifications for 16 to 19 year olds
2017 and 2018 performance tables: technical guidance for awarding organisations

² This list has been informed by a call for examples of good practice in employer involvement in the delivery and assessment of technical qualifications - **Employer involvement in the delivery and assessment of vocational qualifications**

³ DfE work experience guidance

Types of evidence

For each employer involvement activity, centres are required to provide evidence of which learners undertook it, e.g. a candidate attendance register. The types of additional evidence required to support a claim for this component will vary depending on the nature of the involvement. E.g. for a guest lecture it is expected that a synopsis of the lecture and register would be taken which each learner and the guest speaker will have signed; expert witnesses will be identified and will have signed the relevant assessment paperwork for each learner they have been involved in assessing; evidence of contribution from employers to the development of locally set or adapted assignments.

Quality assurance process

As the employer involvement component is a requirement for achieving the KS5 Technical qualifications, it is subject to external quality assurance by City & Guilds at the approval stage and when centres wish to claim certification for learners.

Evidence will be validated by City & Guilds before learners can achieve the employer involvement component. Where employer involvement is not judged to be sufficient, certificates cannot be claimed for learners.

Sufficiency of involvement for each learner

It is expected that the centre will plan a range of activities that provide sufficient opportunities for each learner to interact directly with a range of individuals employed in the related industry. Centres must also provide contingencies for learners who may be absent for part of their teaching, so they are not disadvantaged. Any absence that results in a learner missing arranged activities must be documented. Where learners are unable to undertake all employer involvement activities due to temporary illness, temporary injury or other indisposition, centres should contact City & Guilds for further guidance.

Live involvement

Learners will gain most benefit from direct interaction with employers and/or their staff; however the use of technology (e.g. the use of live webinars) is encouraged to maximise the range of interactions. Where learners are able to interact in real time with employers, including through the use of technology, this will be classed as 'live involvement'.

It is considered good practice to record learning activities, where possible, to allow learners to revisit their experience and to provide a contingency for absent learners. This is not classed as live involvement however, and any involvement of this type for a learner must be identified as contingency.

Timing

A learner who has not met the minimum requirements cannot be awarded the component, and will therefore not achieve the qualification. It is therefore important that centres give consideration to scheduling employer involvement activities, and that enough time is allotted throughout delivery and assessment of the qualification to ensure that requirements are fully met.

5 Assessment

Summary of assessment methods and conditions

Component numbers	Assessment method	Description and conditions
023	Synoptic assignment	<p>The synoptic assignment is externally set, internally marked and externally moderated. The assignment requires candidates to identify and use effectively in an integrated way an appropriate selection of skills, techniques, concepts, theories, and knowledge from across the content area. Candidates will be judged against the assessment objectives.</p> <p>Assignments will be released to centres as per dates indicated in the Assessment and Examination timetable published on our website.</p> <p>Centres will be required to maintain the security of all live assessment materials. Assignments will be password protected and released to centres through a secure method.</p> <p>There will be one opportunity within each academic year to sit the assignment. Candidates who fail the assignment will have one re-sit opportunity. The re-sit opportunity will be in the next academic year, and will be the assignment set for that academic year once released to centres. If the re-sit is failed, the candidate will fail the qualification.</p> <p>Please note that for externally set assignments City & Guilds provides guidance and support to centres on the marking and moderation process.</p>
522	Externally marked exam	<p>The exam is externally set and externally marked, and is taken as a paper based test (522).</p> <p>The exam is designed to assess the candidate's depth and breadth of understanding across content in the qualification at the end of the period of learning, using a range of question types and will be sat under invigilated examination conditions. See JCQ requirements for details: http://www.jcq.org.uk/exams-office/ice---instructions-for-conducting-examinations</p> <p>The exam specification shows the coverage of the exam across the qualification content.</p> <p>Candidates who fail the exam at the first sitting will have one opportunity to re-sit. If the re-sit is failed the candidate will fail the qualification. For exam dates, please refer to the Assessment and Examination timetable.</p>

What is synoptic assessment?

Technical qualifications are based around the development of a toolkit of knowledge, understanding and skills that an individual needs in order to have the capability to work in a particular industry or occupational area. Individuals in all technical areas are expected to be able to apply their knowledge, understanding and skills in decision making to solve problems and achieve given outcomes independently and confidently.

City & Guilds technical qualifications require candidates to draw together their learning from across the qualification to solve problems or achieve specific outcomes by explicitly assessing this through the synoptic assignment component.

In this externally set, internally marked and externally moderated assessment the focus is on bringing together, selecting and applying learning from across the qualification rather than demonstrating achievement against units or subsets of the qualification content. The candidate will be given an appropriately levelled, substantial, occupationally relevant problem to solve or outcome to achieve. For example this might be in the form of a briefing from a client, leaving the candidate with the scope to select and carry out the processes required to achieve the client's wishes, as they would in the workplace.

Candidates will be marked against assessment objectives (AOs) such as their breadth and accuracy of knowledge, understanding of concepts, and the quality of their technical skills as well as their ability to use what they have learned in an integrated way to achieve a considered and high quality outcome.

How the assignment is synoptic for this qualification

The typical assignment brief could be to complete a series of linked practical tasks that are likely to be encountered in a typical vehicle service and repair centre.

This will require the candidate to prepare for, complete and review service and inspection procedures, making decisions based on the information provided and on barriers encountered. Learners will be required to use correct Personal Protective Equipment (PPE), to complete standard service and inspection forms, to select and use appropriate tools for the task and to ensure they work safely at all times. Learners will also be required to research in detail typical automotive career and their interrelationship within the industry.

External exam for stretch, challenge and integration

The external assessment will draw from across the mandatory content of the qualification, using a range of shorter questions to confirm breadth of knowledge and understanding. Extended response questions are included to go into more depth, giving candidates the opportunity to demonstrate higher level understanding and integration through discussion, analysis and evaluation, and ensuring the assessment can differentiate between 'just able' and higher achieving candidates.

Assessment objectives

The assessments for this qualification are set against a set of assessment objectives (AOs) which are used across all City & Guilds Technicals to promote consistency among qualifications of a similar purpose. They are designed to allow judgement of the candidate to be made across a number of different categories of performance.

Each assessment for the qualification has been allocated a set number of marks against these AOs based on weightings recommended by stakeholders of the qualification. This mark allocation remains the same for all versions of the assessments, ensuring consistency across assessment versions and over time.

The following table explains all AOs in detail, including weightings for the synoptic assignments. In some cases, due to the nature of a qualification's content, it is not appropriate to award marks for some AOs. Where this is the case these have been marked as N/A. Weightings for exams (AOs 1, 2 and 4 only) can be found with the exam specification.

Assessment objective	Level 2 Technical Certificate in Automotive Typical expected evidence of knowledge, understanding and skills	Approximate weighting (Assignment)
AO1 Recalls knowledge from across the breadth of the qualification.	Electronic calculations including coefficient of friction, identification of key components and tools, agreed industry terms, units and measurements, health and safety legislation, specialist tools identified for transmission and suspension systems, correct valeting products selected.	20%
AO2 Demonstrates understanding of concepts, theories and processes from across the breadth of the qualification.	Inter-relationships of key parts of the automotive industry, how they connect to each other and in what order, relevant legislation and its impact on service bays and employers and employees, correctly applying inspection and servicing procedures, how key components work together within a vehicle to deliver drive, ability to correctly cost and calculate typical services for customers.	20%
AO3 Demonstrates technical skills from across the breadth of the qualification.	Degree of accuracy, identifying and selecting correct tools and equipment, manual dexterity with tools and equipment, correct automotive workshop and engineering drawings, measuring, testing, health and safety.	30%
AO4 Applies knowledge, understanding and skills from across the breadth of the qualification in an integrated and holistic way to achieve specified purposes.	Applying knowledge and understanding across all tasks, justifying recommendations/approaches taken, applying servicing and inspection routines, key health and safety requirements and expectations including legislative, identifying and using the correct tools for non-standard tasks and contexts, being able to investigate and diagnose routine faults and recommend corrective actions.	15%
AO5 Demonstrates perseverance in achieving high standards and attention to detail while showing an understanding of wider impact of their actions.	Meeting specific requirements of the task, attention to detail when preparing, completing and finishing-up tasks (accuracy, neatness, good house keeping, finishing).	15%

Exam specification

AO weightings per exam

AO	Component 522 weighting (approx. %)
AO1 Recalls knowledge from across the breadth of the qualification.	30
AO2 Demonstrates understanding of concepts, theories and processes from across the breadth of the qualification.	57
AO4 Applies knowledge, understanding and skills from across the breadth of the qualification in an integrated and holistic way to achieve specified purposes.	13

The way the exam covers the content of the qualification is laid out in the table below:

Assessment type: Examiner marked, written exam *

Assessment conditions: Invigilated examination conditions

Grading: X/P/M/D

Test 522	Duration: 2 hours		
Unit	Outcome	Number of marks	Approximate %
201	<ol style="list-style-type: none"> 1 Understand implications of the law with regard to health and safety at work 2 Identify the factors leading to accidents and how to control them 3 Carry out tasks ensuring safety precautions and procedures are followed 	8	12
202	<ol style="list-style-type: none"> 1 Identifying the different career paths within the automotive industry 2 Recognise job roles and requirements 3 Understand types of employment conditions 		
203	<ol style="list-style-type: none"> 1 Recognise the main vehicle system and components that require regular servicing 2 Identify typical service/inspection types 3 Carry out vehicle inspection and service procedures 	8	12
204	<ol style="list-style-type: none"> 1 Understand the types of vehicle fast-fit components and specialist equipment 2 Carry out removal and replacement of fast-fit components 		

205	<ul style="list-style-type: none"> 1 Recognise vehicle braking systems 2 Recognise vehicle steering systems 3 Recognise vehicle suspension systems 	16	25
208	<ul style="list-style-type: none"> 1 Understand the importance of using different positions for engine location 2 Identify different engine types 3 Recognise the working principles of different types of engines 4 Understand the main statutory requirements for engines 	11	17
209	<ul style="list-style-type: none"> 1 Understand the principles of electrical circuits 2 Test electrical circuits 		
210	<ul style="list-style-type: none"> 1 Identify specialist workshop transmission tools and equipment 2 Recognise vehicle transmission system components 3 Remove and replace transmission system components 	13	20
N/A	Integration across the units	9	14
	Total	65	100

*These exams are sat under invigilated examination conditions, as defined by the JCQ:
<http://www.jcq.org.uk/exams-office/ice---instructions-for-conducting-examinations>

Entry for exams can be made through the City & Guilds Walled Garden.

6 Moderation and standardisation of assessment

City & Guilds' externally set assignments for technical qualifications are designed to draw from across the qualifications' content, and to contribute a significant proportion towards the learner's final qualification grade. They are subject to a rigorous external quality assurance process known as external moderation. This process is outlined below. For more detailed information, please refer to 'Marking and moderation - Technicals centre guidance' available to download on the City & Guilds website.

It is vital that centres familiarise themselves with this process, and how it impacts on their delivery plan within the academic year.

Supervision and authentication of internally assessed work

The Head of Centre is responsible for ensuring that internally assessed work is conducted in accordance with City & Guilds' requirements.

City & Guilds requires both tutors and candidates to sign declarations of authenticity. If the tutor is unable to sign the authentication statement for a particular candidate, then the candidate's work cannot be accepted for assessment.

Internal standardisation

For internally marked work⁴ the centre is required to conduct internal standardisation to ensure that all work at the centre has been marked to the same standard. It is the Internal Quality Assurer's (IQA's) responsibility to ensure that standardisation has taken place, and that the training includes the use of reference and archive materials such as work from previous years as appropriate.

Internal appeal

Centres must have an internal process in place for candidates to appeal the marking of internally marked components, ie the synoptic assignment and any optional unit assignments. This must take place before the submission of marks for moderation. The internal process must include candidates being informed of the marks (or grades) the centre has given for internally assessed components, as they will need these to make the decision about whether or not to appeal.

Centres cannot appeal the outcome of moderation for individual candidates, only the moderation process itself. A request for a review of the moderation process should be made to appeals@cityandguilds.com.

Moderation

Moderation is the process where external markers are standardised to a national standard in order to review centre marking of internally marked assessments. These markers are referred to as 'moderators'. Moderators will mark a representative sample of candidates' work from every centre. Their marks act as a benchmark to inform City & Guilds whether centre marking is in line with City & Guilds' standard.

Where moderation shows that the centre is applying the marking criteria correctly, centre marks for the whole cohort will be accepted.

Where moderation shows that the centre is either consistently too lenient or consistently too harsh in comparison to the national standard, an appropriate adjustment will be made to the marks of the whole cohort, retaining the centre's rank ordering.

Where centre application of the marking criteria is inconsistent, an appropriate adjustment for the whole cohort may not be possible on the basis of the sample of candidate work. In these instances a complete remark of the candidate work may be necessary. This may be carried out by the centre based on feedback provided by the moderator, or carried out by the moderator directly.

Moderation applies to all internally marked assignments. Following standardisation and marking, the centre submits all marks and candidate work to City & Guilds via the moderation platform. The deadline for submission of evidence will be available on Walled Garden. See the *Marking and moderation - Technicals Centre Guidance* document for full details of the requirements and process.

In most cases candidate work will be submitted directly to the moderator for moderation. This includes written work, photographic and pictorial evidence, or video and audio evidence. For some qualifications there will be a requirement for moderators to visit centres to observe practical assessments being undertaken. This will be for qualifications where the assessment of essential learner skills can only be demonstrated through live observation. The purpose of these visits is to ensure that the centre is assessing the practical skills to the required standards, and to provide the moderators with additional evidence to be used during moderation. These visits will be planned in advance with the centre for all relevant qualifications.

Post-moderation procedures

Once the moderation process has been completed, the confirmed marks for the cohort are provided to the centre along with feedback from the moderator on the standard of marking at the centre, highlighting areas of good practice, and potential areas for improvement. This will inform future marking and internal standardisation activities.

City & Guilds will then carry out awarding, the process by which grade boundaries are set with reference to the candidate evidence available on the platform.

Centres retaining evidence

Centres must retain assessment records for each candidate for a minimum of three years. To help prevent plagiarism or unfair advantage in future versions, candidate work may not be returned to candidates. Samples may however be retained by the centre as examples for future standardisation of marking.

7 Grading

Awarding individual assessments

Individual assessments will be graded, by City & Guilds, as pass/merit/distinction where relevant. The grade boundaries for pass and distinction for each assessment will be set through a process of professional judgement by technical experts. Merit will usually be set at the midpoint between pass and distinction. The grade descriptors for pass and distinction, and other relevant information (eg archived samples of candidate work and statistical evidence) will be used to determine the mark at which candidate performance in the assessment best aligns with the grade descriptor in the context of the qualification's purpose. Boundaries will be set for each version of each assessment to take into account relative difficulty.

Please note that as the Merit grade will usually be set at the arithmetical midpoint between pass and distinction, there are no descriptors for the Merit grade for the qualification overall.

Grade descriptors

To achieve a pass, a candidate will be able to

- Demonstrate the knowledge and understanding required to work in the occupational area, its principles, practices and legislation.
- Describe some of the main factors impacting on the occupation to show good understanding of how work tasks are shaped by the broader social, environmental and business environment it operates within.
- Use the technical industry specific terminology used in the industry accurately.
- Demonstrate the application of relevant theory and understanding to solve non-routine problems.
- Interpret a brief for complex work related tasks, identifying the key aspects, and showing a secure understanding of the application of concepts to specific work related tasks.
- Carry out planning which shows an ability to identify and analyse the relevant information in the brief and use knowledge and understanding from across the qualification (including complex technical information) to interpret what a fit for purpose outcome would be and develop a plausible plan to achieve it.
- Achieve an outcome which successfully meets the key requirements of the brief.
- Identify and reflect on the most obvious measures of success for the task and evaluate how successful they have been in meeting the intentions of the plan.
- Work safely throughout, independently carrying out tasks and procedures, and having some confidence in attempting the more complex tasks.

To achieve a distinction, a candidate will be able to

- Demonstrate the excellent knowledge and understanding required to work to a high level in the occupational area, its principles, practices and legislation.
- Analyse the impact of different factors on the occupation to show deep understanding of how work tasks are shaped by the broader social, environmental, and business environment it operates within.
- Demonstrate the application of relevant theory and understanding to provide efficient and effective solutions to complex and non-routine problems.
- Analyse the brief in detail, showing confident understanding of concepts and themes from across the qualification content, bringing these together to develop a clear and stretching plan, that would credibly achieve an outcome that is highly fit for purpose.

- Achieve an outcome which shows an attention to detail in its planning, development and completion, so that it completely meets or exceeds the expectations of the brief to a high standard.
- Carry out an evaluation in a systematic way, focussing on relevant quality points, identifying areas of development/ improvement as well as assessing the fitness for purpose of the outcome.

Awarding grades and reporting results

The overall qualification grade will be calculated based on aggregation of the candidate's achievement in each of the assessments for the mandatory units, taking into account the assessments' weighting. The **Level 2 Technical Certificate in Automotive** will be reported on a four grade scale: Pass, Merit, Distinction, Distinction*.

All assessments **must** be achieved at a minimum of Pass for the qualification to be awarded. Candidates who fail to reach the minimum standard for grade Pass for an assessment(s) will not have a qualification grade awarded and will not receive a qualification certificate.

The approximate pass grade boundary for the synoptic assignment in this qualification are:

Synoptic Assignment	Pass Mark (%)
023	50

Please note that each synoptic assignment is subject to an awarding process before final grade boundaries are confirmed.

The contribution of assessments towards the overall qualification grade is as follows:

Assessment method	Grade scale	% contribution
Synoptic Assignment	X/P/M/D	60%
Exam	X/P/M/D	40%

Both synoptic assignments and exams are awarded (see 'Awarding individual assessments', at the start of Section 7, above), and candidates' grades converted to points. The minimum points available for each assessment grade is listed in the table below. A range of points between the Pass, Merit and Distinction boundaries will be accessible to candidates. For example a candidate that achieves a middle to high Pass in an assessment will receive between 8 and 10 points, a candidate that achieves a low to middle Merit in an assessment will receive between 12 and 14 points. The points above the minimum for the grade for each assessment are calculated based on the candidate's score in that assessment.

	Pass	Merit	Distinction
Assignment: 60%	6	12	18
Exam: 40%	6	12	18

The candidate's points for each assessment are multiplied by the % contribution of the assessment and then aggregated. The minimum points required for each qualification grade are as follows:

Qualification Grade	Points
Distinction*	20.5
Distinction	17
Merit	11
Pass	6

Candidates achieving Distinction* will be the highest achieving of the Distinction candidates.

8 Administration

Approved centres must have effective quality assurance systems to ensure valid and reliable delivery and assessment of qualifications. Quality assurance includes initial centre registration by City & Guilds and the centre's own internal procedures for monitoring quality assurance procedures.

Consistent quality assurance requires City & Guilds and its associated centres to work together closely; our Quality Assurance Model encompasses both internal quality assurance (activities and processes undertaken within centres) and external quality assurance (activities and processes undertaken by City & Guilds).

For this qualification, standards and rigorous quality assurance are maintained by the use of:

- internal quality assurance
- City & Guilds external moderation.

In order to carry out the quality assurance role, Internal Quality Assurers (IQAs) must have and maintain an appropriate level of technical competence and have recent relevant assessment experience. For more information on the requirements, refer to *Section 2: Centre requirements* in this handbook.

To meet the quality assurance criteria for this qualification, the centre must ensure that the following procedures are followed:

- suitable training of staff involved in the assessment of the qualification to ensure they understand the process of marking and standardisation
- completion by the person responsible for internal standardisation of the Centre Declaration Sheet to confirm that internal standardisation has taken place
- the completion by candidates and supervisors/tutors of the record form for each candidate's work.

External quality assurance

City & Guilds will undertake external moderation activities to ensure that the quality assurance criteria for this qualification are being met. Centres must ensure that they co-operate with City & Guilds staff and representatives when undertaking these activities.

City & Guilds requires the Head of Centre to

- facilitate any inspection of the centre which is undertaken on behalf of City & Guilds
- make arrangements to receive, check and keep assessment material secure at all times,
- maintain the security of City & Guilds confidential material from receipt to the time when it is no longer confidential and
- keep completed assignment work and examination scripts secure from the time they are collected from the candidates to their dispatch to City & Guilds.

Enquiries about results

The services available for enquiries about results include a review of marking for exam results and review of moderation for internally marked assessments.

For further details on enquiries and appeals process and for copies of the application forms, please visit the **appeals page** of the City & Guilds website at **www.cityandguilds.com**.

Re-sits and shelf-life of assessment results

Candidates who have failed an assessment or wish to re-take it in an attempt to improve their grade, can re-sit assessments **once only**. The best result will count towards the final qualification. See guidance on individual assessment types in Section 5.

Factors affecting individual learners

If work is lost, City & Guilds should be notified immediately of the date of the loss, how it occurred, and who was responsible for the loss. Centres should use the JCQ form, JCQ/LCW, to inform City & Guilds Customer Services of the circumstances.

Learners who move from one centre to another during the course may require individual attention. Possible courses of action depend on the stage at which the move takes place. Centres should contact City & Guilds at the earliest possible stage for advice about appropriate arrangements in individual cases.

Malpractice

Please refer to the City & Guilds guidance notes *Managing cases of suspected malpractice in examinations and assessments*. This document sets out the procedures to be followed in identifying and reporting malpractice by candidates and/or centre staff and the actions which City & Guilds may subsequently take. The document includes examples of candidate and centre malpractice and explains the responsibilities of centre staff to report actual or suspected malpractice. Centres can access this document on the City & Guilds website.

Examples of candidate malpractice are detailed below (please note that this is not an exhaustive list):

- falsification of assessment evidence or results documentation
- plagiarism of any nature
- collusion with others
- copying from another candidate (including the use of ICT to aid copying), or allowing work to be copied
- deliberate destruction of another's work
- false declaration of authenticity in relation to assessments
- impersonation.

These actions constitute malpractice, for which a penalty (eg disqualification from the assessment) will be applied.

Where suspected malpractice is identified by a centre after the candidate has signed the declaration of authentication, the Head of Centre must submit full details of the case to City & Guilds at the earliest opportunity. Please refer to the form in the document *Managing cases of suspected malpractice in examinations and assessments*.

Access arrangements and special consideration

Access arrangements are adjustments that allow candidates with disabilities, special educational needs and temporary injuries to access the assessment and demonstrate their skills and knowledge

without changing the demands of the assessment. These arrangements must be made before assessment takes place.

It is the responsibility of the centre to ensure at the start of a programme of learning that candidates will be able to access the requirements of the qualification.

Please refer to the *JCQ access arrangements and reasonable adjustments and Access arrangements - when and how applications need to be made to City & Guilds* for more information. Both are available on the City & Guilds website: <http://www.cityandguilds.com/delivering-our-qualifications/centre-development/centre-document-library/policies-and-procedures/access-arrangements-reasonable-adjustments>

Special consideration

We can give special consideration to candidates who have had a temporary illness, injury or indisposition at the time of the examination. Where we do this, it is given after the examination.

Applications for either access arrangements or special consideration should be submitted to City & Guilds by the Examinations Officer at the centre. For more information please consult the current version of the JCQ document, *A guide to the special consideration process*. This document is available on the City & Guilds website: <http://www.cityandguilds.com/delivering-our-qualifications/centre-development/centre-document-library/policies-and-procedures/access-arrangements-reasonable-adjustments>

Level:	2
GLH:	30

What is this unit about?

The purpose of this unit is for learners to have an understanding of the health & safety requirements of working in an automotive maintenance and repair environment.

This unit looks at the various health & safety regulations and safe working practices.

Learners will also have the opportunity to understand the practical application of these regulations and safe working practices.

Learning outcomes

In this unit, learners will be able to:

1. Understand implications of the law with regard to health and safety at work
2. Identify the factors leading to accidents and how to control them
3. Carry out tasks ensuring safety precautions and procedures are followed

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning Outcome 1: Understand the implications of the law in regard to health and safety at work

Topic 1.1: Implications to the individual and employer of current health and safety legislation

Topic 1.2: Employer and employee responsibilities

Topic 1.1

The learner needs to know the main legal requirements that apply in the automotive service and repair environment. They also need to know the implications of this legislation and how it affects them and their employer. They do not need to know the specific details of each regulation but just the main areas that it covers.

The learner needs to have an understanding of the implications of the following legislation:

- Abrasive Wheels Regulations
- COSHH Regulations
- Environmental Protection Act
- Health & Safety at Work Act
- Personal Protective Equipment at Work
- Protection of Eyes Regulations
- Provision and Use of Work Equipment

Topic 1.2

The learners needs to be able to understand the various statements made within the regulations and be able to give practical examples from their individual working environment.

The learner needs to be able to give examples in terms of:

- A safe place of work
- Safe equipment
- Safe systems and environment
- Safe methods of handling and storing
- Reporting accidents
- Taking reasonable care of their own health & safety and that of others

Learning Outcome 2: Identify the factors leading to accidents and how to control them

Topic 2.1: Causes of accidents

Topic 2.2: Prevention of accidents

Topic 2.3: Making positive decisions

Topic 2.1

Learners need to know what the likely causes of accidents are that occur in the service and repair environment and understand the implications of these causes.

The learner needs to understand the main causes of accidents in the working environment as:

- Carelessness
- Improper behaviour and dress

- Lack of training
- The effects of alcohol and drugs
- Unguarded or faulty tools and equipment
- Inadequate ventilation
- Poor housekeeping

Topic 2.2

The learner needs to understand how to prevent or reduce the causes of accidents in the working environment by:

- Eliminating the hazard
- Replacing the hazard with something less dangerous
- Guarding the hazard
- Personal protection
- Safety education and training

Topic 2.3

The learner needs to understand the importance of making positive decisions and work responsibly by:

- Protecting themselves
- Protecting other people
- Protecting the environment
- Knowing the dangers that can occur
- Knowing what protection is available
- Knowing how to prevent accidents

Learning Outcome 3: Carry out tasks ensuring safety precautions and procedures are followed

Topic 3.1: Safety procedures to prevent injury

Topic 3.2: Safety precautions and procedures to be followed when carrying out tasks

Topic 3.1

The learner needs to understand the main safety procedure to prevent injury to themselves and other by:

- Using personal protective equipment for skin, eyes and hands
- Preventing hair, clothing, etc., being caught in machinery and other moving parts and components
- Using safety guards

Topic 3.2

The learner needs to understand the main safety precautions and procedure when carrying out tasks in the working environment in the following situations:

- When working with flammable gases, liquids and harmful substances
- When working on vehicle electrical systems, hybrid vehicles, fuel systems, cooling systems, tyres & wheels, tilting cabs and tipping bodies
- When running and manoeuvring vehicles especially in confined spaces
- Before working on defective vehicles
- When hoisting, lifting or jacking up vehicle and using support stands

- When drilling, grinding and using compressed air
- When using hand and power tools
- When storing, binning, issuing or handling spare parts
- When disposing of waste material

Guidance for delivery

It is important that the learners have a full understanding of the underpinning knowledge of each of the topics. Very important is the practical application of this knowledge and understanding in the working environment. Learners must be able to apply their knowledge and understanding when working on a range of vehicle types, different types of equipment and working environments. Although some of the content will be delivered in a classroom situation it is important that learners can relate this knowledge and understanding to actual workshop situations and practical tasks.

Employer engagement is essential in order to maximise the value of learners' experience. A partnership approach should be adopted where possible with employers with whom the consortium has links, and with employers used for work experience placements.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the sectors may be able to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date.

Level:	2
GLH:	30

What is this unit about?

The purpose of this unit is for the learner to understand the career options and progression within the automotive industry. This will include practical exercises that enable a learner to demonstrate an understanding of the automotive industry, learner's will be able to recognise the career paths and different skill requirements involved in the automotive industry and therefore developing knowledge of industry requirements.

Learning outcomes

In this unit, learners will be able to

1. Identify the different career paths within the automotive industry
2. Recognise job roles and requirements
3. Understand types of employment conditions

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome 1: Identify the different career paths within the automotive industry

Topic 1.1: Different business types

Topic 1.2: Career path requirements for the different types of business

Topic 1.3: Interdependence of the business types

Topic 1.1

The learner should research the types of companies/businesses in the automotive industry, their main areas of income and the way in which business type links with others with regards to technology and income generators.

- Main dealer
- Franchise dealer
- Independent repairer
- Body repairer
- Recovery service
- Fast fit
- Fleet operator
- Specialist repairer
- Mobile repairer

Topic 1.2

The learner should be able to explain the different career paths within the different types of businesses

- Mechanical repair apprenticeship through to aftersales manager in a dealership
- Mechanical repair apprenticeship through to workshop manager in an independent repairer
- Sales apprenticeship through to sales manager in a dealership
- Parts apprenticeship through to parts manager in a dealership
- Accident repair apprenticeship through to body shop manager/estimator
- Accident paint apprenticeship through to body shop manager/estimator
- Department manager through to general manager of a dealership

Topic 1.3

The learner should be able to identify the types of businesses that are interdependent on other business for their operation and how the dependence between business type can be an advantage or disadvantage in their operation

- Independent repairer and dealerships
- Dealerships and specialist repairers
- Body repair shops, maintenance repair workshops, vehicle breakdown services/recovery and sales
- Automotive industry suppliers of goods and services, from admin services to marketing
- Smart repair body repairers
- Accountancy business and automotive industry

Learning outcome 2: Recognise job roles and requirements

Topic 2.1: Different job roles required within the automotive industry

Topic 2.2: Changes within the automotive industry

Topic 2.3: Job role responsibilities

Topic 2.1

The learner should be able to research the different role types requirements within the automotive industry, the job role requirements for different business type and the requirements for staff in respects of training requirements to gain entry onto a career path

- the changes in roles for mechanics to technicians in respects to responsibility, entry qualifications into the industry and technology requirements
- the changes in roles for technicians to senior technicians in respects to responsibility, entry qualifications into the industry and technology requirements
- the changes in roles for technician to master technicians in respects to responsibility, entry qualifications into the industry and technology requirements
- How automotive staff are graded i.e. technician to master technician and the importance place upon them
- Identify the different staff requirements for the different business types, from accountants to valeting/cleaning staff, from general manager to workshop manager

Topic 2.2

The learner should be able to research how businesses have changed their staffing roles and requirements over the years, how training in the automotive industry has developed of the years and the changing requirements of training

- Compare the different automotive roles between independent and dealerships business
- The changes over the years placed upon accident repair staff to accommodate customer requirements
- Look at the accreditation schemes for automotive staff i.e. ATA and how it works for the different automotive sectors, for example independent repairs to dealership, approved accident repair shops to independent accident repair work shops

Topic 2.3

The learner should be able to identify key job role responsibilities within the automotive industry, and the importance of understanding role responsibilities. Learners should identify how health and safety has impacted upon the roles and responsibilities within the automotive industry and the changes to job roles:

- technicians
- senior technicians
- master technicians
- parts advisors
- sale executives
- accident body repair
- accident paint repair staff
- employers

Learning outcome 3: Understand types of employment conditions

Topic 3.1: Types of employment

Topic 3.2: Appraisal system

Topic 3.3: Methods of how employment can be terminated

Topic 3.1

The learner should be able to explain the different ways staff can be contracted/employed to carry out work for a company as well as the advantages and disadvantages of the different types of employment methods

- Apprenticeships
- Part time
- Full time
- Short term contracts
- Long term contracts
- Flexi hours
- Self employed

Topic 3.2

The learner should be able to explain the purpose of staff appraisal system and identify the benefits of staff appraisals and how appraisals can:

- motivate staff to work well
- help a company identify measures to improve operation
- help identify training and progression within a business
- ensure effective communication between employees and employers

Topic 3.3

The learner should be able to identify ways in which an employee or employer can terminate their employment, the purpose of a reference, key elements of a reference and what is meant by 'Unfair and constructive dismissal'

- the importance of a reference and who will be writing it and its implication to gaining employment

Termination of employment

- not being able to do your job properly
- illness
- redundancy
- summary dismissal
- A 'statutory restriction'
- It's impossible to carry on employing you
- A 'substantial reason'

Guidance for delivery

Learners must be encouraged to develop an independent learning approach to their studies, this means that they should be encouraged to use various means of learning resources.

Learners should be challenged to explore ideas, deliver subject related talks to their team members so developing them as a person and their knowledge and understanding of the unit content.

This unit should be delivered to learners through practical experience and theoretical researching, therefore developing the independent learning ability of learners.

Learners should be encouraged to design charts, posters and structure diagrams to demonstrate a greater of the unit and understanding of the subjects to be covered.

This unit will involve English and maths so will also develop their skill level for employment and apprenticeships.

Employer engagement is essential in order to maximise the value of learners' experience. A partnership approach should be adopted where possible with employers with whom the consortium has links, and with employers used for work experience placements.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the sectors may be able to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date.

It is important that the subject content covered is relative to the automotive industry, this means that product knowledge, practical skills and testing methods taught are what is required by the industry currently. This means that the qualification will always be relative to the industry that it relates to, also that local industry employers should be engaged and consulted as to how this qualification will be relevant to them and what skills are important to them. When delivering this qualification employability should foremost be in line with the qualification content

Level:	2
GLH:	30

What is this unit about?

The purpose of this unit is for learners to understand and develop a range of skills used when carrying out vehicle inspection and service procedures. Learners will develop the skills needed to use tools and equipment when carrying out vehicle inspections and removing service components. Learners will also develop the understanding of any health and safety considerations when using this equipment during these vehicle operations. On completion of this unit, learners will be able to provide informed answers and demonstrate their knowledge of the related vehicle systems they are working on.

To achieve this unit learners will need to develop a broad understanding of the types of tools and equipment required in an automotive inspection and service workshop. Selection of the appropriate equipment, parts and techniques to suit a particular vehicle system is an important aspect of this unit. Working safely at all times and an understanding of the effect their actions can have on the safety of others is essential.

Learning outcomes

In this unit, learners will be able to

1. Recognise the main vehicle system and components that require regular servicing
2. Identify typical service /inspection types
3. Carry out vehicle inspection and service procedures

Scope of content

Learning outcome 1: Recognise the main vehicle systems and components that require regular servicing

Topic 1.1: Main inspection and service components

Topic 1.2: Inspection and servicing tools and measuring equipment

Topic 1.1

Learners must be able to identify the main components/systems that require scheduled servicing and know their location and function. For this unit it is not expected that they will have an understanding of the construction and operation of these units but they need to know where and what regular servicing is required.

Engine

- Lubrication system (levels, oil and filter)
- Camshaft drive belts (condition and adjustment)
- Ignition system (spark plugs)
- Cooling system (level, leakage points, antifreeze and fans)
- Exhaust system (mountings)
- Air supply system (filters)
- Fuel system (leakage points and filters)

Transmission

- Gearbox (levels and leakage points)
- Final drive (levels and leakage points)
- Clutch operating mechanism (adjustment, fluid levels)
- Drive/propeller shafts (gaiters and joints)

Chassis

- Brakes (levels, linkage, friction surfaces and hoses/pipes)
- Steering (levels, wear points and drive belts)
- Suspension (wear points and dampers)
- Wheels & tyres (wear and damage)

Electrical

- Lights (adjustment points)
- Battery (terminals)
- Alternator (drive belts and adjustment points)
- Instruments

Body

- Seat belts (locations)
- Door locks

Topic 1.2

Learners must be aware of the different types of workshop tools and equipment that are required for carrying out routine vehicle maintenance.

Tools

- lifting (vehicle lifts and portable jacks)
- supports (chassis stands and wheel chocks)
- hand tools (spanners, sockets, power tools)
- torque wrenches
- measuring tools (dial test indicator, vernier and micrometer)

Equipment

- oil draining and refilling
- electrical measuring (multi meter)
- battery testing
- cooling system testing (pressure and antifreeze)
- tyre pressure and depth gauges
- diagnostic interface (OBD)
- brake inspection and cleaning

Learning outcome 2: Identify typical servicing/inspection types

Topic 2.1: Servicing and inspection types

Topic 2.1

Learners need to know the different types of servicing and inspection that is routinely carried out on vehicles prior to and during use. They will also need to know the tasks that would be included in each type of service. It is therefore recommended that they research manufacturers servicing schedules.

Types of service and inspection

- Pre-delivery
 - Applies to new vehicles
 - Checking operation of systems prior to use
 - Checking vehicle meets legal requirements
- First service
 - Carried out a short after the owner takes delivery
 - Check systems have 'settled in' and no noticeable faults
 - Update vehicle systems
 - Not always part of manufacturers service but offered as 'good will'
- Interim service
 - Checking of main systems for security and wear
 - Update vehicle systems
 - Changing of oil and filter
 - Checking body for condition
- Main service
 - Checking of main systems for security and wear
 - Update vehicle systems
 - Changing of oil and filter
 - Checking body for condition
 - Brake fluid change
 - Renewal of some components (spark plugs and drive belts)
 - Air brake maintenance

- Safety checks
 - Checking main systems for security and wear (Body, brakes, steering, suspension and tyres)
- Seasonal checks
 - Checking of cooling system(antifreeze, leakage, etc)
 - Often includes a safety check

Learning outcome 3: Carry out vehicle inspection and service procedures

Topic 3.1: Interpret vehicle information and data

Topic 3.2: Apply inspection and service procedures

Topic 3.3: Dispose of waste products correctly

Topic 3.1

The learner must be able to select and use the appropriate vehicle information and data to carry out vehicle inspections and service procedures.

- owners service book
- job cards and work orders
- manuals and data books
- electronic data and procedures systems

Know the type of information contained in a service report.

Topic 3.2

Apply procedures to carry out basic service and inspection tests.

Body

- body - corrosion and damage checks
- glass – condition checks
- door lock - operation
- seat belts - condition and security

Engine

- exhaust system - checks
- oil and filter - changing and checking levels
- air filter - checking and replacement
- fuel filter - replacement
- coolant system - inspection for condition and leakage
- ignition components - renew spark plugs
- use of on-board diagnostics (OBD)

Chassis

- Steering components - wear and security
- Suspension components - wear and security
- Brake components - wear security and changing fluid

Transmission

- Gearbox and final drive - checking security and oil level
- Clutch mechanism – wear and adjustment
- drive-line – wear and damage to gaiters
- bearings - wear

Electrical

- lighting –operation and alignment
- horn - operation
- instrumentation – operation
- information - operation

Topic 3.3

The learners must be able to understand the need to dispose of waste correctly in line with local and wider regulations, including health and safety guidelines. They must also have an understanding of the effects on the environment of not disposing of waste correctly.

Correct waste disposal of the following to be included.

- oils
- coolant
- filters (fuel and oil)
- metals
- plastics

Guidance for delivery

It is important that the learners have a full understanding of the underpinning knowledge of each of the topics. Very important is the practical application of this knowledge and understanding in the working environment. Learners must be able to apply their knowledge and understanding when working on a range of vehicle types, different types of equipment and working environments. Although some of the content will be delivered in a classroom situation it is important that learners can relate this knowledge and understanding to actual workshop situations and practical tasks.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the sectors may be able to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date.

It is important that the subject content covered is relative to the automotive industry, this means that product knowledge, practical skills and testing methods taught are what is required by the industry currently. This means that the qualification will always be relative to the industry that it relates to, also that local industry employers should be engaged and consulted as to how this qualification will be relevant to them and what skills are important to them. When delivering this qualification employability should foremost be in line with the qualification content

Level:	2
GLH:	30

What is this unit about?

The purpose of this unit is for learners to understand and develop a range of skills used in an automotive fast-fit workshop. Learners will develop the skills needed to use tools and equipment needed to remove fast-fit vehicle components. Learners will also develop the understanding of any health and safety considerations when using this equipment during these vehicle operations. On completion of this unit, learners will be able to provide informed answers and demonstrate their knowledge of the related vehicle systems they are working on.

Learning outcomes

In this unit, learners will be able to

1. Understand the types of vehicle fast-fit components and specialist equipment
2. Carry out removal and replacement of fast-fit components

Scope of content

Learning outcome 1: Understand the types of vehicle fast-fit components and specialist equipment

Topic 1.1: Types of tyres and specialist equipment

Topic 1.2: Exhaust components and specialist equipment

Topic 1.3: Steering and suspension components and specialist alignment equipment

Topic 1.4: Batteries and specialist test and maintenance equipment

Topic 1.5: Automotive workshop tools and equipment

Learners must be familiar with the types of components that are classified as fast-fit vehicles and the specialist equipment required. Learners must also be aware of the construction, location and details of the components and how the equipment is used.

Topic 1.1

Construction details

- tyre and wheel construction
- wheel types
- tyre speed ratings
- tyre legal requirements
- tyre load indexing

Equipment

- static and dynamic balancing equipment
- tyre removal and fitting equipment
- drills, reamers, glues, plugs

Topic 1.2

Construction and location

- silencers
- flexible couplings
- catalytic convertor
- Diesel particulate filter (DPF)
- mountings gaskets and clamps

Equipment

- Torque wrench
- Silencer connection paste

Topic 1.3

Construction and location

- Steering rack & pinion and steering boxes
- Steering rods and joints
- Suspension springs
- Suspension dampers

Equipment

- Tracking alignment gauges
- 4 wheel alignment (demonstration only)
- Camber, castor swivel/king pin inclination gauges

Topic 1.4

Construction and location

- Lead acid
- Gel types
- Battery capacities and performances

Equipment

- Volt
- Amp
- Hydrometer
- Battery testers

Topic 1.5

- Lifting equipment
- Chassis stands and wheel chocks
- Hand tools
- Torque wrenches

Learning outcome 2: Carry out removal and replacement of fast-fit components

Topic 2.1: Remove and replace wheels and tyres

Topic 2.2: Remove and replace an exhaust system

Topic 2.3: Use wheel alignment equipment

Learners must be able to select and use the appropriate vehicle lifting equipment and use hand and specialist tools to remove and replace a range of fast-fit components as well as checking for correct operation and identify any possible component failure

Topic 2.1

- Remove wheel and tyre as a unit
- Remove tyre from wheel
- Inspect for damage and legality
- Repair a puncture
- Inflate tyre to specification
- Balance wheel and tyre
- Fit wheel and torque to specification

Topic 2.2

- Remove the exhaust system
- Identify the main components
- Fit and align an exhaust system
- Check exhaust for leaks

Topic 2.3

- Remove a steering joint and check for wear
- Remove a suspension damper and check for wear
- Fit a suspension joint and suspension damper

- Use tracking and camber (or 4 wheel alignment) to align front wheels

Guidance for delivery

It is important that the learners have a full understanding of the underpinning knowledge of each of the topics. Very important is the practical application of this knowledge and understanding in the working environment. Learners must be able to apply their knowledge and understanding when working on a range of vehicle types, different types of equipment and working environments. Although some of the content will be delivered in a classroom situation it is important that learners can relate this knowledge and understanding to actual workshop situations and practical tasks.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the sectors may be able to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date.

It is important that the subject content covered is relative to the automotive industry, this means that product knowledge, practical skills and testing methods taught are what is required by the industry currently. This means that the qualification will always be relative to the industry that it is relates to, also that local industry employers should be engaged and consulted as to how this qualification will be relevant to them and what skills are important to them. When delivering this qualification employability should foremost be in line with the qualification content

Level:	2
GLH:	30

What is this unit about?

The purpose of this unit is for learners to understand the construction and operation of vehicle chassis systems and components. This includes braking, steering and suspension systems used for light vehicles, heavy vehicles and motorcycles.

This unit looks at how the various components and units are constructed, how they operate and how they interact with other components and vehicle systems

Learners will also have the opportunity to understand the practical application of these systems and units and be able to identify the various different types.

Learning outcomes

In this unit, learners will be able to:

1. Recognise vehicle braking systems
2. Recognise vehicle steering systems
3. Recognise vehicle suspension systems

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning Outcome 1: Recognise vehicle braking systems

- Topic 1.1:** Braking systems in their usual forms and locations
- Topic 1.2:** Purpose and functional requirements of braking systems
- Topic 1.3:** Working principles of braking systems
- Topic 1.4:** Main components of braking systems

Topic 1.1

The learner needs to understand the different types of braking systems, how they differ and the reasons for using the different types.

- Disc brakes
- Drum brakes

Topic 1.2

The learner needs to understand the importance of the braking system, being able to reduce the speed of the vehicle during braking applications and when necessary bring the vehicle to a complete stop. They also need to understand that the braking system is used to hold the vehicle stationary when parking.

The learner needs to understand that the braking system of the vehicle needs to be operated with low effort from the driver. Also that a back-up system has to be provided if there is a failure with the main braking system. It is also important to understand that, in order to maintain full vehicle control, the wheels must not lock under braking conditions.

- Purpose is to:
 - Reduce vehicle speed
 - Stop the vehicle
 - Hold vehicle stationary
- Functional requirements
 - To apply a braking force without excessive driver effort
 - Provide a back-up system in the event of a main system failure
 - Prevent the wheel locking under severe braking

Topic 1.3

The learner needs to understand the principles that enable the braking system to meet its main functional requirements.

- Use of friction
- Use of levers, rods, cables, compressed air and hydraulics to transmit/increase force
- Use of split braking systems
- Calculation of brake efficiency
- The effect of weight transfer
- Prevention of brake fade

Topic 1.4

The learner needs to recognise and be able to state the purpose and working principles of the main braking system components, to include:

- Master cylinders

- Brake servos
- Brake cylinders and callipers
- Brake shoes, drums, pads and discs
- Air brake compressor
- Air brake chambers
- Equalisation valves

Learning Outcome 2: Recognise vehicle steering systems

Topic 2.1: Steering systems in their usual forms and locations

Topic 2.2: Purpose and functional requirements of the steering system

Topic 2.3: Working principles of the steering system

Topic 2.4: Main components of the steering system

Topic 2.1

The learner needs to understand the different types of steering systems, how they differ and the reasons for using the different types.

- Single track rod types
- Divided track rod types
- Twin steered axle types

Topic 2.2

The learner needs to understand the main purposes and functional requirements of the various systems as to:

- Providing a means of changing vehicle direction with minimum driver effort
- Providing a degree of feel without transmitting shock loading to the driver
- To achieve minimal tyre slip

Topic 2.3

The learner needs to understand the working principles which enable the functional requirements to be met, to include:

- Incorporating the Ackermann principle for true rolling motion
- Using camber angle and swivel pin inclination for centre point steering
- Using caster angle to provide directional stability and self centring steering
- Using rake and trail angles to maintain stability and responsiveness
- The need for correct wheel alignment (toe-in and toe-out)
- Calculating movement ration, force ratio and efficiency of various steering gearboxes

Topic 2.4

The learner needs to recognise and be able to state the purpose and working principles of the main steering system components, to include:

- Steering wheel and column
- Steering gearboxes
 - Worm and sector
 - Rack and pinion
 - Recirculating ball
 - Power assisted steering systems
- Headstock and forks
- Steering idlers

- Steering joints
- Swivel pins
- Front hubs and bearings
- Drop arms, drag links and track rods

Learning Outcome 3: Recognise vehicle suspension systems

Topic 3.1: Suspension system in their usual forms and locations

Topic 3.2: Purpose and functional requirements of the suspension system

Topic 3.3: Working principles of the suspension system

Topic 3.4: Main components of the suspension system

Topic 3.1

The learner needs to understand the different types of suspension systems, how they differ and the reasons for using the different types.

- Independent
- Non-independent

Topic 3.2

The learner needs to understand the main purposes and functional requirements of the various systems as to:

- Minimising the effects of road surface irregularities
- Maintain wheel contact with the road
- Transmitting driving and braking torques
- Locating axles
- Supporting the sprung weight
- Minimising unsprung weight

Topic 3.3

The learner needs to understand the working principles which enable the functional requirements to be met, to include:

- Stating the reasons why various material are used
- Describing the forces acting on the suspension
- Stating the methods of energy conversion in all types of suspension spring
- Understanding spring movement relative to time when a spring is damped or undamped
- Calculating driving and braking forces and reactions

Topic 3.4

The learner needs to recognise and be able to state the purpose and working principles of the main suspension system components, to include:

- Beam axles
- Live axles
- Suspension struts
- Wishbones
- Suspension and spring linkages
- Springs (leaf, coil, torsion, rubber, air)
- Suspension dampers (telescopic and lever)
- Telescopic forks
- Telelever and duolever systems
- Ball joints and bushes

- Anti-roll bars
- Bound and rebound stops

Guidance for delivery

It is important that the learners have a full understanding of the underpinning knowledge of each of the topics. The theory of operation and construction is very important but equally important is the practical application of this knowledge and understanding. Learners must be able to apply their knowledge and understanding to a range of vehicle types and systems. Included in types is the application of these systems, not only to light vehicles, but to heavy vehicles and motor cycles. Although some of the content will be delivered in a classroom situation it is important that learners can relate this knowledge and understanding to actual vehicle applications. During the classroom delivery it is expected that learners will have access to the various components being discussed. They must then be able to apply this to the various components when fitted to a vehicle.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the sectors may be able to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date.

It is important that the subject content covered is relative to the automotive industry, this means that product knowledge, practical skills and testing methods taught are what is required by the industry currently. This means that the qualification will always be relative to the industry that it relates to, also that local industry employers should be engaged and consulted as to how this qualification will be relevant to them and what skills are important to them. When delivering this qualification employability should foremost be in line with the qualification content

Suggested learning resources

Books

Light & Heavy Vehicle Technology – Nunney M J
Fundamentals of Motor Vehicle Technology – Hillier VAW
Motorcycle Maintenance Techbook – Weighill K

Websites

City and Guilds Smartscreen - <http://www.smartscreen.co.uk/>

Level:	2
GLH:	30

What is this unit about?

The purpose of this unit is for the learner to understand the principles of costing workshop repairs. This will include practical exercises that enable a learner to demonstrate an understanding of how to construct a repair invoice for a customer, learner's will be able to recognise what is required to produce a repair quote and invoice, in doing so developing skills for the learners to meet industry requirements.

Learning outcomes

In this unit, learners will be able to

1. Understand the requirements for costing repairs
2. Design invoices for customer repairs
3. Calculate repair invoices

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome 1: Understand the requirements for costing repairs

Topic 1.1: Business terms

Topic 1.2: Terms used when costing repairs

Topic 1.3: Repair information

Topic 1.1

The learner needs to understand, in a very basic way, the following terms used in business, it is not expected that they will be able to calculate or directly apply them

- Business terms
 - Fixed assets
 - Current assets
 - Current liabilities
 - Capital
 - Balance sheet
 - Profit and Loss
 - Net profit
 - Fixed costs
 - Variable costs
 - Direct costs
 - Indirect costs
 - Overheads
 - Cash flow
 - Wholesale and Retail
 - Consumables

- Staff time management
 - Productivity
 - Efficiency
 - Utilisation

Topic 1.2

The learner needs to understand the main purposes and differences between the various business documents. For example the difference between an estimate and a quote and the use of each. The learner also needs to be aware of the legal requirements in relation to the sale of goods and services.

- Documents:
 - Quote
 - Estimate
 - Warranty
 - Statement
 - Credit note
 - Invoice
 - Parts order
 - VAT

- An awareness of the requirements of the Sale of Good Act in relation to a contract
- An awareness of the requirements of the Trade Description Act
- Basic requirements of making a contract in relation to sale of goods and services

Topic 1.3

The learner needs to be aware of the importance of repair times and the need to complete job cards clearly and accurately and how this is then linked to invoicing.

- Understanding how repair times can effect costs and profitability of repair
- Identifying the importance of a properly completed workshop job card
- Interpretation of job card information to correctly cost a repair
- Understanding why itemising can be a positive approach to customer invoice and understanding

Learning outcome 2: Design invoices for customer repairs

Topic 2.1: Research information needed on repair invoices

Topic 2.2: Legal requirements of a repair invoice

Topic 2.3: Design a repair invoice

Topic 2.1

The learner needs to have an understanding of the information that needs to be included on a customer invoice. They will also need to be aware of the information that is required generally by the business and if any warranty claims are to be made.

- Invoice layouts
- Information required
- Research the elements required for a repair invoice

Topic 2.2

The learner needs to be aware of the information and details that must legally be included on an invoice. This will include the requirements for VAT registered businesses:

- Unique serial number on invoices
- Dates of supply, tax point
- VAT registration number, Rate of VAT, Amount of VAT
- Total invoice amount without and with
- Customer number and address

Topic 2.3

The learner needs to have the knowledge to be able to produce an invoice. They must design an invoice, to include all of the relevant information, ensuring clarity and ease of understanding.

Learning outcome 3: Calculate repair invoices

Topic 3.1: Calculating repair operation times using manufacturer data

Topic 3.2: Itemising repairs for transparency in costing

Topic 3.3: Calculating total repair invoice

Topic 3.1

The learner will be expected to be able to read, understand and interpret information in order to calculate repair operation times using appropriate data

- Using repair times manuals or electronic data to
 - Identify individual repair costs
 - Interpret manufacturer repair times in relation to how time is divided up

- Understand how times are used to link to costs

Topic 3.2

The learner needs to understand how to itemise repairs and times to provide for transparency in costing. This will need to show a breakdown of each individual repair in respect of time, parts, consumables and surcharges.

Topic 3.3

The learner will need to be aware of how to calculate total repair costs and know how to calculate the following.

- VAT
- Labour charges
- Discounted rates
- Invoice totals
- Surcharges
- None VAT items
- Parts totals
- Itemised billing showing individual repair sub total costings

Guidance for delivery

Learners must be encouraged to develop an independent learning approach to their studies, this means that they should be encouraged to use various means of learning resources.

Learners should be challenged to explore ideas and deliver subject related talks to their team members so developing them as a person and their knowledge.

This unit should be delivered to learners through practical experience and theoretical researching, therefore developing the independent learning ability of learners.

Learners should be encouraged to design and make the documentation required to provide greater experience of the unit and understanding of the subjects to be covered.

This unit will involve English and maths so also developing their skill level for employment and apprenticeships.

Employer engagement is essential in order to maximise the value of learners' experience. A partnership approach should be adopted where possible with employers with whom the consortium has links, and with employers used for work experience placements.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the sectors may be able to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date.

It is important that the subject content covered is relative to the automotive industry, this means that product knowledge, practical skills and testing methods taught are what is required by the industry currently. This means that the qualification will always be relative to the industry that it relates to, also that local industry employers should be engaged and consulted as to how this qualification will be relevant to them and what skills are important to them. When delivering this qualification employability should foremost be in line with the qualification content

Level:	2
GLH:	30

What is this unit about?

The purpose of this unit is for learners to understand and develop a range of practical and knowledge skills used in an automotive workshop. Learners will better understand the range of tools and equipment available for different tasks and any safety considerations when using this equipment. On completion of this unit, learners will be able to provide informed answers and demonstrate their ability to select and use a range of marking, measuring and cutting equipment in a safe manner.

Learning outcomes

In this unit, learners will be able to

1. Understand automotive engineering marking out and measuring tools
2. Interpret engineering drawings for automotive service and repair
3. Use automotive tools and joining equipment for cutting and threading

Scope of content

Learning outcome 1: Understand automotive engineering marking out and measuring tools

Topic 1.1: Marking out tools

Topic 1.2: Measuring tools

Topic 1.1

The learner will be able to use the following marking out tools

- Scribes
- Punches
- Squares
- Scribing blocks
- Engineers blue

Topic 1.2

The learner will be able to use the following measuring tools used in an automotive environment

- Vernier gauges
- DTI
- Micrometers
- Rules and tape

Learning outcome 2: Interpret engineering drawings for automotive service and repair

Topic 2.1: Engineering drawings

Topic 2.2: Automotive workshop drawings

Topic 2.1

The learner will be able to understand and follow simple engineering drawings used for making or repairing vehicle components. They will need to understand the following drawing conventions and representations

- orthographic projections
- first angle
- third angle
- line styles
- dimensions
- datum
- tolerance

Topic 2.2

The learner will need to be able to read and understand the following types of drawings in manuals, parts books and electronic representations.

- cross section
- exploded
- dismantled

Learning outcome 3: Use automotive tools and joining equipment for cutting and threading

- Topic 3.1:** Types of cutting tools
Topic 3.2: Types of electric drills
Topic 3.3: Types of files
Topic 3.4: Types of thread cutting equipment

The learner must be able to select and use the appropriate marking out and measuring equipment in the context of repairing or manufacturing a motor vehicle component. The importance of accuracy, finish and tolerances should be enforced during the practical tasks.

Topic 3.1

The learner will need to know and demonstrate the correct and safe use of these cutting tools.

- hacksaw
- junior hacksaw
- padsaw
- files and variants

Topic 3.2

The learner will need to know and demonstrate the correct and safe use of drills.

- pillar drill
- hand drill

Topic 3.3

The learner will need to know and demonstrate the correct and safe use of these files.

- bastard
- second cut
- smooth

Topic 3.4

The learner will need to know and demonstrate the correct and safe use of these thread cutting tools.

- taps and holder
- dies and holder
- die nut
- thread restorer
- cutting paste

Guidance for delivery

It is important that the learners have a full understanding of the underpinning knowledge of each of the topics. Very important is the practical application of this knowledge and understanding in the automotive working environment. Although some of the content will be delivered in a classroom situation it is important that learners can relate this knowledge and understanding to actual workshop situations and practical tasks.

Employer engagement is essential in order to maximise the value of learners' experience. A partnership approach should be adopted where possible with employers with whom the consortium has links, and with employers used for work experience placements.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the sectors may be able to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date.

It is important that the subject content covered is relative to the automotive industry, this means that product knowledge, practical skills and testing methods taught are what is required by the industry currently. This means that the qualification will always be relative to the industry that it relates to, also that local industry employers should be engaged and consulted as to how this qualification will be relevant to them and what skills are important to them. When delivering this qualification employability should foremost be in line with the qualification content

Level:	2
GLH:	30

What is this unit about?

The purpose of this unit is for learners to understand the construction and operation of vehicle engine systems and components. This includes engines used for light vehicles, heavy vehicles and motorcycles.

This unit looks at how the various components and units are constructed, how they operate and how they interact with other components and vehicle systems

Learners will also have the opportunity to understand the practical application of these systems and units and be able to identify the various different types.

Learning outcomes

In this unit, learners will be able to:

1. Understand the importance of using different positions for engine location
2. Identify different engine types
3. Recognise the working principles of different types of engines
4. Understand the main statutory requirements for engines

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning Outcome 1: Understand the importance of using different positions for engine location

Topic 1.1: Locations of engines

Topic 1.2: Importance of different engine positions

Topic 1.1

The learner needs to recognise the different locations used for engines:

- front
- mid
- rear
- transverse
- longitudinal
- under-slung

Topic 1.2

The learner needs to understand the reasons for fitting engines in different positions:

- effects on vehicle design
- effects on engine design
- effects on traction
- effect on road holding and handling

Learning Outcome 2: Identify different engine types

Topic 2.1: Different engine types

Topic 2.1

The learner needs to understand the different types of engine, their design features and reasons and advantages for their use:

- in-line
- vee
- single and multi cylinders
- spark ignition
- compression ignition
- two stroke and four stroke
- hybrid

Learning Outcome 3: Recognise the working principles of different types of engine

Topic 3.1: Engine operation

Topic 3.2: Definition of terminology

Topic 3.3: Main engine components

Topic 3.1

The learner needs to understand engine operation:

- two stroke spark ignition
- four stroke spark ignition
- four stroke compression ignition
- the combustion process
- the conversion of reciprocating motion to rotary motion

Topic 3.2

The learner needs to understand the terminology used in respect of engines:

- T.D.C
- B.D.C
- Stroke
- Bore
- Engine and cylinder capacity
- Swept volume
- Compression ratio
- Valve timing including valve lead, lag and overlap
- Pressure/supercharged

Topic 3.3

The learner needs to recognise and understand the purpose of the main engine components:

- cylinder head
- cylinder block
- crankcase
- cylinder liners
- crankshaft
- flywheel
- pistons
- connecting rod
- valves and valve operating mechanisms

Learning Outcome 4: Understand the main statutory requirements

Topic 4.1: Main statutory requirements

Topic 4.1

The learner needs to understand the main statutory requirements that apply to engine design and operation:

- Silencers and noise
- Smoke emission
- Exhaust and crankshaft emission
- Power to weight ratio

Guidance for delivery

It is important that the learners have a full understanding of the underpinning knowledge of each of the topics. The theory of operation and construction is very important but equally important is the practical application of this knowledge and understanding. Learners must be able to apply their knowledge and understanding to a range of vehicle types and systems. Included in types is the application of these systems, not only to light vehicles, but to heavy vehicles and motorcycles. Although some of the content will be delivered in a classroom situation it is important that learners can relate this knowledge and understanding to actual vehicle applications. During the classroom delivery it is expected that learners will have access to the various components being discussed. They must then be able to apply this to the various components when fitted to a vehicle.

Employer engagement is essential in order to maximise the value of learners' experience. A partnership approach should be adopted where possible with employers with whom the consortium has links, and with employers used for work experience placements.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the sectors may be able to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date.

It is important that the subject content covered is relative to the automotive industry, this means that product knowledge, practical skills and testing methods taught are what is required by the industry currently. This means that the qualification will always be relative to the industry that it relates to, also that local industry employers should be engaged and consulted as to how this qualification will be relevant to them and what skills are important to them. When delivering this qualification employability should foremost be in line with the qualification content

Suggested learning resources

Books

Light & Heavy Vehicle Technology – Nunney M J

Fundamentals of Motor Vehicle Technology – Hillier VAW

Motorcycle Maintenance Techbook – Weighill K

Websites

City and Guilds Smartscreen - <http://www.smartscreen.co.uk/>

Level:	2
GLH:	30

What is this unit about?

The purpose of this unit is for the learner to understand the principles and operation of automotive electronics. This will include practical exercises that enable a learner to demonstrate an understanding of electrical circuit operation. Learners will also be able to recognise electrical components/symbols used in automotive applications, electrical circuit operation and calculate electrical flow. Testing of electrical circuits, components and developing skills for the learners to meet industry requirements.

Learning outcomes

In this unit, learners will be able to

1. Understand the principles of electrical circuits
2. Test electrical circuits

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome 1: Understand the principles of electrical circuits

Topic 1.1: Safety requirements when working with electrical circuits and testers

Topic 1.2: Functions and operations of electrical components used in automotive applications

Topic 1.3: Electrical units

Topic 1.4: Electrical symbols

Topic 1.1

The learner will need to be aware of the safety precautions when working on vehicle electrical and electronic systems to include:

- Batteries/starter/alternators - when testing and removing/replacing
- Lighting components and systems
- avoidance of short circuits and power surge
- prevention and protection of electrical shock
- protection of electrical and electronic components
- protection of circuits from overload or damage

The learner will need to know the correct and safe use of the following equipment to test circuits and components for values and continuity.

- digital and analogue multi-meters
- voltmeter
- ammeter/amp clamps
- ohmmeter
- oscilloscope
- dedicated test equipment

Topic 1.2

The learner will need to know the function, construction, operation and application of the following electrical components:

- Relays
- Lamps to include
 - LEDs
 - Gas discharge lamps
 - Halogen lamps
 - Filament lamps
- Motors
 - starter
 - wiper
 - stepper
- Circuit protection
 - types of fuse
 - circuit breakers
- Transistors and diodes
- Active and passive speed sensors

- inductive pulse generators
- hall effect generators
- Batteries
 - lead acid conventional – to include capacities and ratings
 - maintenance free
 - gel
 - cleaning terminals and battery tops
 - protecting terminals
 - cell top-up for non-sealed units
 - securing of battery to frame/housing
 - removal and refitting procedures
 - testing
- Battery faults:
 - low charge
 - battery not holding charge
 - sulphating
 - battery voltage drop during different component operation
 - damaged plates and insulators

Topic 1.3

The learner needs to understand the various electrical units, circuit layouts and effects with a circuit.

- Volt (electrical pressure)
- Ampere (electrical current)
- Ohm (electrical resistance)
- Watts (electrical power)
- series circuits
- parallel circuits
- current flow
- voltage at components
- volt drop
- resistance
- the effects of open circuit component(s)

Topic 1.4

The learner will need to be able to recognise the electrical circuit symbols used for the following components

- Batteries
- Cables
- Switches
- Motors
- Generators
- Lamps
- Diodes
- Transistors
- Relays
- Fuses
- meters

Learning outcome 2: Design and test electrical circuits

Topic 2.1: Use electrical circuit principles

Topic 2.2: Calculations using Ohms Law

Topic 2.1

The learner needs to know how to carry out the following calculations using Ohms Law. They will also need to be able to manipulate the formula to calculate other values.

- electrical resistance in a circuit
- electrical power in a circuit
- current flow within an electrical circuit
- voltage drop in a circuit
- resistance in series circuits
- resistance in parallel circuits

Topic 2.2

The learner will need to know symptoms and how to check electric circuits and components for the following faults:

- high resistance
- loose and corroded connections
- short circuit
- excessive current consumption
- open circuit
- malfunction
- battery faults
- poor starting
- faulty components

Guidance for delivery

It is important that the learners have a full understanding of the underpinning knowledge of each of the topics. Very important is the practical application of this knowledge and understanding in the working environment. Learners must be able to apply their knowledge and understanding when working on a range of vehicle types, different types of equipment and working environments. Although some of the content will be delivered in a classroom situation it is important that learners can relate this knowledge and understanding to actual workshop situations and practical tasks.

Employer engagement is essential in order to maximise the value of learners' experience. A partnership approach should be adopted where possible with employers with whom the consortium has links, and with employers used for work experience placements.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the sectors may be able to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date.

It is important that the subject content covered is relative to the automotive industry, this means that product knowledge, practical skills and testing methods taught are what is required by the industry currently. This means that the qualification will always be relative to the industry that it relates to, also that local industry employers should be engaged and consulted as to how this qualification will be

relevant to them and what skills are important to them. When delivering this qualification employability should foremost be in line with the qualification content

Suggested learning resources

There are various resources from automotive books based around level 2 technology. Internet based sites are good source of material for this unit

Level 1 Principles of Light Vehicle Maintenance and Repair (Heinemann):- ISBN – 978-0435048150

Level 2 Principles of Light Vehicle Maintenance and Repair (Heinemann):- ISBN – 978-0435048167

Fundamentals of Motor Vehicle Technology (Hillier VAW) :- ISBN - 978-1408515181

Automotive Electrics/Automotive Electronics (Bosch Handbooks):- ISBN - 978-0470519370

Hillier's Fundamentals of Automotive Electronics: Second Edition: - ISBN - 978-0748726950

Hillier's Fundamentals of Automotive Electronics Book 2 Sixth Edition:- ISBN - 978-1408515372

Workshop manuals

Level:	2
GLH:	30

What is this unit about?

The purpose of this unit is for learners to understand the construction and operation of vehicle transmission systems and components. This includes clutch, gearbox, drive-line and hub bearing systems.

This unit looks at how the various components and units are constructed, how they operate and how they interact with other components and vehicle systems

Learners will also have the opportunity to understand the practical application of these systems and units and be able to identify the various different types.

Learning outcomes

In this unit, learners will be able to

1. Identify specialist workshop transmission tools and equipment
2. Recognise vehicle transmission system components
3. Remove and replace transmission system components

Scope of content

Learning outcome 1: Identify specialist workshop transmission systems used in automotive workshops

Topic 1.1: Transmission tools and equipment

Topic 1.1

The learner will need to understand the correct and safe way of using the following tools and equipment when working on transmission systems

- Transmission lifting equipment
- Clutch alignment tools
- Hydraulic and mechanical press
- Torque wrenches
- D.T.I and micrometer

Learning outcome 2: Recognise transmission system vehicle components and their purpose

Topic 2.1: Purposes of the transmission systems

Topic 2.2: Manual transmission system components

Topic 2.3: Other transmission types

Topic 2.1

The learner will need to understand the main purposes of a vehicle transmission system.

- To provide a smooth take up of drive
- To allow permanent and temporary breaks in the drive
- To provide an increase in torque
- To allow a range of vehicle speeds
- To transmit the drive through various angles

Topic 2.2

The learner will need to know the construction and operation of the main transmission components and units

Single and multi plate clutches

- Clutch drive plates
- Clutch pressure plates
- Clutch release bearings
- Clutch operating mechanisms

Manual Gearboxes

- Gearbox construction
- The need for a range of ratios
- Gearbox operating mechanisms

Drive-line

- Front wheel drive layout and shaft components
- Rear wheel drive layout and shaft components

- Four wheel drive layout and shaft components
- Bearing types and layouts for hubs and shafts

Topic 2.3

The learner will need to have an awareness of the following other types of transmissions that may be used.

- Automatic Transmission
- Constant Variable Transmission (CVT)
- Dual Clutch System (DSG)
- Four-wheel drive and transfer box

Learning outcome 3: Remove and replace transmission system components

Topic 3.1: Transmission components

Topic 3.2: Use mathematical number skills for clutch, gearbox and drive-line systems

The learner must be able to select and use the appropriate transmission equipment, use hand and specialist tools to remove and replace a range of transmission components. Identify failure and check for correct operation.

Use vehicle data for specification and legal requirements and report on findings

Topic 3.1

Removal and replacement of transmission components

- gearbox
- clutch
- drive-line
- bearings

Topic 3.2

Use mathematical number skills for clutch, gearbox and drive-line systems

- clutch torque - single and multi-plate (Torque = spring force x coefficient of friction x mean radius x number of friction surfaces)
- gearbox ratios – simple and compound (Gear ratio = diameter of driven gear ÷ diameter of driver gear) and
- (Gear ratio = (diameter of driven gear ÷ diameter of driver gear) X (diameter of driven gear ÷ diameter of driver gear))
- final drive ratio and torque multiplication (Torque output = torque input X Gear ratio X efficiency)

Guidance for delivery

It is important that the learners have a full understanding of the underpinning knowledge of each of the topics. Very important is the practical application of this knowledge and understanding in the working environment. Learners must be able to apply their knowledge and understanding when working on a range of vehicle types, different types of equipment and working environments. Although some of the content will be delivered in a classroom situation it is important that learners can relate this knowledge and understanding to actual workshop situations and practical tasks.

Employer engagement is essential in order to maximise the value of learners' experience. A partnership approach should be adopted where possible with employers with whom the consortium has links, and with employers used for work experience placements.

It would be helpful for teachers to develop a method of maintaining contact with a range of employers in the sectors may be able to help with keeping the examples of legislation, policies and codes of practice used in the taught content, up to date.

It is important that the subject content covered is relative to the automotive industry, this means that product knowledge, practical skills and testing methods taught are what is required by the industry currently. This means that the qualification will always be relative to the industry that it is relates to, also that local industry employers should be engaged and consulted as to how this qualification will be relevant to them and what skills are important to them. When delivering this qualification employability should foremost be in line with the qualification content

Level:	2
GLH:	30

What is this unit about?

The purpose of this unit is for learners to understand and develop a range of skills used in an automotive valet workshop. Learners will develop the skills needed to use tools and equipment needed to valet the inside and outside of light vehicles. Learners will also develop the understanding of any health and safety considerations when using this equipment during these vehicle operations. On completion of this unit, learners will be able to provide informed answers and demonstrate their knowledge of the related vehicle systems they are working on.

Learning outcomes

In this unit, learners will be able to

1. Select valeting products
2. Carry out valeting activities

Scope of content

Learning outcome 1: Select valeting products

Topic 1.1: cleaning polishes, liquids and chemicals for vehicles

Topic 1.2: valeting equipment and tools

The learner must be able to identify and select the appropriate equipment, chemicals and techniques to suit a particular vehicle surface. They must also be aware of safety at all times and have an understanding of the effect their actions can have on the safety of themselves, others and the vehicle.

Topic 1.1

Selection of vehicle exterior valeting products

- Detergents for exterior wash
- Waterless exterior washes
- Polishes for paint surface
- cutting compounds
- Alloy wheel chemicals and acids
- Tyre dressing

Selection of vehicle interior valeting products

- Glass cleaner
- Vinyl cleaner
- Leather cleaner
- Carpet and cloth cleaner

Topic 1.2

Use of valeting tools and equipment

- General tools
- Bucket
- Sponges
- Chamois
- Cloths
- Hoses
- Power pressure wash
- Power mop
- Vacuum - wet
- Vacuum - dry

Learning outcome 2: carry out valeting activities

The learner will be able to demonstrate the skills needed to safely clean and valet the interior and exterior of the vehicle using the equipment, detergents, polishers and chemicals following the manufactures guidelines to protect themselves, others and the vehicle.

Topic 2.1: Valet exterior of vehicles

Topic 2.2: Valet interior of vehicles

Topic 2.3: Disposing of waste products correctly

The learner must be able to select the appropriate equipment, chemicals and adopt appropriate techniques to suit particular vehicle surfaces. They must also be aware of safety at all times and have an understanding of the affect their actions can have on the safety of themselves, others and the vehicle.

The learner will need to be able to demonstrate the skills to safely clean and valet the interior and exterior of a vehicle using the equipment, detergents, polishers and chemicals following the manufactures guidelines to protect themselves, others and the vehicle.

Topic 2.1

Vehicle exterior

- wash the exterior with correct detergents
- use cutting compounds
- apply polishes
- use glass cleaners
- apply alloy wheel cleaning chemicals
- dress the tyres

Topic 2.2

Vehicle interior

- use vacuum cleaner
- use glass cleaner
- use upholstery cleaners

The learners must be able to understand the need to dispose of waste correctly in line with local and wider regulations, including health and safety guidelines. They must also have an understanding of the effects to the environment of not disposing of waste correctly

Topic 2.3

Correct disposal of the following

- contaminated water
- rags and cloths
- waste plastic containers
- waste metal containers
- paper and cardboards

Guidance for delivery

It is important that the learners have a full understanding of the underpinning knowledge of each of the topics. Very important is the practical application of this knowledge and understanding in the working environment. Learners must be able to apply their knowledge and understanding when working on a range of vehicle types, different types of equipment and working environments. Although some of the content will be delivered in a classroom situation it is important that learners can relate this knowledge and understanding to actual workshop situations and practical tasks.

Employer engagement is essential in order to maximise the value of learners' experience. A partnership approach should be adopted where possible with employers with whom the consortium has links, and with employers used for work experience placements.

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Level:	2
GLH:	30

What is this unit about?

The purpose of this unit is for the learner to understand the principles and operation of the various elements of an automotive repair business. This will include practical exercises that enable a learner to demonstrate an understanding of the business model required for a successful operation, learners will be able to recognise the elements required to promote and understand business structure and therefore develop skills for the learners to meet industry requirements.

Learning outcomes

In this unit, learners will be able to

1. Understand the different roles that make up a business structure
2. Determine business marketing methods
3. Recognise different customer types

Scope of content

This section gives details of the scope of content to be covered in the teaching of the unit to ensure that all the learning outcomes can be achieved.

Learning outcome 1: Understand the different roles that make up a business structure

Topic 1.1: Differences between business types

Topic 1.2: Different roles within an organisation

Topic 1.3: Job role requirements

Topic 1.1

The learner must have an awareness of the different types of businesses and understand the advantages and disadvantages of each type. They must also be aware of different types of organisations and the staffing and role structure within them.

Business classification:

- Sole trader
- Partnership
- Private limited company
- Public limited company

Understand the advantages and disadvantages of

- Sole trader
- Partnership
- Private limited company
- Public limited company

Understand the different types of organisation and the services provided by them

- Main dealer
- Franchise dealer
- Independent repairer
- Fast fit
- Fleet operator
- Specialist repairer
- Mobile repairer
- Body repairer
- Breakdown / Recovery specialists

Topic 1.2

- Understanding the importance of knowing a companies structure
- Identifying the different roles within a company / organization
- Responsibilities of the different roles within an organisation

Topic 1.3

- Identify the requirements within various job roles in an automotive organisation
 - Managers (service/parts/body)
 - Supervisors (service/parts/body)
 - Technician (service/parts/body)
 - Apprentices/trainees (service/parts/body)
- Understand the importance of a job description in relation to employer and employee

- Clearly defined roles
- Responsibilities
- Lines of responsibility
- Lines of communication

Learning outcome 2: Determine business marketing methods

- Topic 2.1:** Identifying marketing requirements
Topic 2.2: Understanding the different marketing mediums
Topic 2.3: Understanding the importance of company image

Topic 2.1

The learner must be able to know how to promote an organisation and design a basic marketing plan

- Identify business marketing requirements to promote an organisation
- Design a basic marketing plan to promote a business's services

Topic 2.2

The learner must be able to understand the reasons for different marketing mediums.

- Identify the various marketing mediums available to businesses
- Evaluate the worth of different marketing mediums available to businesses
- Understand the advantages and disadvantages of different marketing mediums

Topic 2.3

The learner needs to have an understanding of :

- Trading aims
- Mission statement
- Importance of setting a good impression to customers
- Importance of promoting the Company image
- Identifying good practice within an organisation
- The importance of good telephone technique's
- Identifying factors that can improve a company's image
- Understanding the meaning of brand values within a company

Learning outcome 3: Recognise different customer types

- Topic 3.1:** Main customer types
Topic 3.2: Customer relations techniques
Topic 3.3: Customer complaints

Topic 3.1

The learner will need to be able to identify the different customer profiles and know how to react with each type

- Business
- Private
- Informed

- Non-informed
- New
- Regular

Topic 3.2

The learner will need to know, when dealing with a customer the importance of:

- Knowing your product
- Listening and talking to the customer
- Positive language and tone
- Admitting mistake
- Maintaining professionalism
- Using different methods of communications and the reasons for using them

Topic 3.3

The learner will need to understand why customers may complain and how to deal with them. They will also need to be able to identify the different complaint groups and how to deal with them

- Identify different reasons why customer may complain
- Techniques used to resolve customer complaints
- Identify good complaint procedures

Identify the different customer complaint group and how to deal with them

- Rarely complains
- Always complains
- Walk away

Guidance for delivery

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Appendix 1 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.

City & Guilds Centre Manual

This document provides guidance for organisations wishing to become City & Guilds approved centres, as well as information for approved centres delivering City & Guilds qualifications. It covers the centre and qualification approval process as well as providing guidance on delivery, assessment and quality assurance for approved centres.

It also details the City & Guilds requirements for ongoing centre and qualification approval, and provides examples of best practice for centres. 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 and malpractice
- complaints and appeals
- equal opportunities
- data protection
- management systems
- maintaining records
- internal quality assurance
- external quality assurance.

Our Quality Assurance Requirements

This document explains the requirements for the delivery, assessment and awarding of our qualifications. All centres working with City & Guilds must adopt and implement these requirements across all of their qualification provision. Specifically, this document:

- specifies the quality assurance and control requirements that apply to all centres
- sets out the basis for securing high standards, for all our qualifications and/or assessments
- details the impact on centres of non-compliance

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

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

Useful contacts

UK learners General qualification information	E: learnersupport@cityandguilds.com
International learners General qualification information	E: intcg@cityandguilds.com
Centres Exam entries, Certificates, Registrations/enrolment, Invoices, Missing or late exam materials, Nominal roll reports, Results	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	E: singlesubjects@cityandguilds.com
International awards Results, Entries, Enrolments, Invoices, Missing or late exam materials, Nominal roll reports	E: intops@cityandguilds.com
Walled Garden Re-issue of password or username, Technical problems, Entries, Results, e-assessment, Navigation, User/menu option, Problems	E: walledgarden@cityandguilds.com
Employer Employer solutions, Mapping, Accreditation, Development Skills, Consultancy	T: +44 (0)121 503 8993 E: business@cityandguilds.com

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

About City & Guilds

As the UK's leading vocational education organisation, City & Guilds is leading the talent revolution by inspiring people to unlock their potential and develop their skills. City & Guilds is recognised and respected by employers across the world as a sign of quality and exceptional training.

City & Guilds Group

The City & Guilds Group is a leader in global skills development. Our purpose is to help people and organisations to develop their skills for personal and economic growth. Made up of City & Guilds, City & Guilds Kineo, The Oxford Group and ILM, we work with education providers, businesses and governments in over 100 countries.

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