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Specification

Edexcel BTEC Level 2 and Level 3 Diploma in Motorcycle Maintenance and Repair Principles (QCF)

Edexcel BTEC Level 2 and Level 3 Diploma in Motorcycle Maintenance and Repair Competence (QCF)

First registration November 2011

A PEARSON COMPANY

Edexcel, a Pearson company, is the UK's largest awarding organisation offering vocational and academic qualifications and testing, to employers, training providers, colleges, schools, and other places of learning in the UK, and in over 85 countries worldwide.

Our specialist suite of qualifications include NVQs, Apprenticeships, WorkSkills, Functional Skills, Foundation Learning, as well as our exclusive range of BTECs, from entry level right through to Higher National Diplomas.

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Contents

Qualification titles covered by this specification

This specification gives you the information you need to offer the Edexcel Principles and Competence qualifications in Motorcycle Maintenance and Repair (QCF) at Level 2 and 3.

Qualification title	Qualification Number (QN)	Operational start date
Edexcel BTEC Level 2 Diploma in Motorcycle Maintenance and Repair Principles (QCF)	600/3557/2	01/11/2011
Edexcel Level 2 Diploma in Motorcycle Maintenance and Repair Competence (QCF)	600/3547/X	01/11/2011
Edexcel BTEC Level 3 Diploma in Motorcycle Maintenance and Repair Principles (QCF)	600/3560/2	01/11/2011
Edexcel Level 3 Diploma in Motorcycle Maintenance and Repair Competence (QCF)	600/3558/4	01/11/2011

These qualifications have been accredited within the Qualifications and Credit Framework (QCF) and are eligible for public funding as determined by the Department for Education (DfE) under Section 96 of the Learning and Skills Act 2000.

The qualification titles listed above feature in the funding lists published annually by the DfE and the regularly updated website. They will also appear on the Learning Aim Reference Application (LARA), where relevant.

You should use the QCF Qualification Number (QN), when you wish to seek public funding for your learners. Each unit within a qualification will also have a unique QCF unit reference number, which is listed in this specification.

The QCF qualification title and unit reference numbers will appear on the learners' final certification document. Learners need to be made aware of this when they are recruited by the centre and registered with Edexcel.

Key features of the Edexcel Principles and Competence qualifications in Motorcycle Maintenance and Repair (QCF) at Levels 2 and 3

These qualifications:

- are nationally recognised
- are based on the Maintenance and Repair – Motorcycle National Occupational Standards (NOS). The NOS, assessment strategy and qualification structure(s) are owned by the Sector Skills Council the Institute of the Motor Industry (IMI).

The qualifications in this specification have been approved as a components in the Intermediate and Advanced apprenticeship frameworks in Motorcycle Maintenance and Repair.

What is the purpose and benefits of these qualifications?

These qualifications give learners with flexible access to industry supported Level 2 and 3 skills programmes, which act as a real alternative to academic qualifications for those who prefer this style of learning and achievement. As part of apprenticeship frameworks, the qualification supports learners in providing a career pathway into jobs and training at technician level and higher.

Learners will have the opportunity to learn and demonstrate their skills, knowledge and competence in assessing and repairing a range of motorcycles.

Who are these qualifications for?

These qualifications are for all learners aged 16 and above who are capable of reaching the required standards.

Edexcel's policy is that the qualifications should:

- be free from any barriers that restrict access and progression
- ensure equality of opportunity for all wishing to access the qualifications.

Centres should be aware that within the Level 2 qualifications in this specification, learners will be required to meet the demands of unit(s) at Level 3. Centres are advised to consider the support, guidance and opportunities they give to learners to meet the demands of the higher level units during delivery and assessment of the qualifications.

What are the potential job roles for those working towards these qualifications?

- Technician
- Diagnostic Technician

What progression opportunities are available to learners who achieve these qualifications?

Learners can progress on to other Edexcel automotive apprenticeship programmes and/or related qualifications detailed in *Annexe A*. Other progression routes include; further work or work experience, academic qualification(s) such as one or more GCSEs, higher education programmes and/or Foundation Degree, or employment into a range of jobs at Level 2 and 3.

What is the qualification structure for the Edexcel BTEC Level 2 Diploma in Motorcycle Maintenance and Repair Principles (QCF)?

A minimum of 70 credits is required to achieve this qualification. 29 credits from the mandatory generic units in Group A, 37 credits from the mandatory specialist units in Group B and a minimum of 4 credits achieved by selecting one of the 2 option groups from Group C. All subcomponents of the chosen groups must be completed.

Individual units can be found in the *Units* section.

Unit No.	Unit Reference No.	Unit Title	Credit	Level
Group A – Mandatory generic units Learners must achieve 29 credits from this group.				
1	D/601/6171	Knowledge of Health, Safety and Good Housekeeping in the Automotive Environment	3	2
2	Y/601/7254	Skills in Health, Safety and Good Housekeeping in the Automotive Environment	7	2
3	J/601/6262	Skills in Supporting Job Roles in the Automotive Work Environment	5	3
4	T/601/6175	Knowledge of Support for Job Roles in the Automotive Work Environment	3	3
5	K/601/6237	Knowledge of Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment	4	2
6	Y/601/6279	Skills in Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment	7	2
Group B – Mandatory specialist units Learners must achieve 37 credits from this group.				
7	F/601/5515	Knowledge of Routine Motorcycle Maintenance	2	2
8	F/601/5594	Skills in Routine Motorcycle Maintenance	2	2
9	R/601/5597	Skills in Motorcycle Internal Engine Systems	5	2
10	Y/601/5519	Knowledge of Motorcycle Internal Engine Systems	3	2

Unit No.	Unit Reference No.	Unit Title	Credit	Level
11	T/601/5527	Knowledge of Motorcycle Fuel, Ignition, Air and Exhaust System Units and Components	3	2
12	D/601/5604	Skills in Removing and Replacing Motorcycle Electrical Units and Components	5	2
Unit No.	**Unit Reference No.**	**Unit Title**	**Credit**	**Level**
Group B – Mandatory specialist units continued				
13	H/601/5555	Knowledge of Removing and Replacing Motorcycle Electrical Units and Components	6	2
14	M/601/5610	Skills in Removing and Replacing Motorcycle Chassis Units and Components	5	2
15	T/601/5558	Knowledge of Removing and Replacing Motorcycle Chassis Units and Components	6	2
Group C – Optional groups Learners must achieve a minimum of 4 credits from **one** of the Option Groups.				
Group C1 – Optional group 1 If this group is chosen, learners must achieve 10 credits from this group.				
16	M/601/6286	Skills to Identify and Agree Motor Vehicle Customer Service Needs	5	3
17	R/601/6247	Knowledge of how to Identify and Agree Motor Vehicle Customer Service Needs	5	3
Group C2 – Optional group 2 If this group is chosen, learners must achieve 4 credits from this group.				
18	F/601/5563	Knowledge of Motorcycle Preparation and Inspection	2	2
19	Y/601/5617	Skills in Motorcycle Preparation and Inspection	2	2

What is the qualification structure for the Edexcel Level 2 Diploma in Motorcycle Maintenance and Repair Competence (QCF)?

A minimum of 95 credits is required to achieve this qualification. 29 credits from the mandatory generic units in Group A, 57 credits from the mandatory specialist units in Group B and a minimum of 9 credits achieved by selecting one of the 2 option groups from Group C. All subcomponents of the chosen groups must be completed.

Individual units can be found in the *Units* section.

Unit No.	Unit Reference No.	Unit Title	Credit	Level
Group A – Mandatory generic units Learners must achieve 29 credits from this group.				
1	D/601/6171	Knowledge of Health, Safety and Good Housekeeping in the Automotive Environment	3	2
4	T/601/6175	Knowledge of Support for Job Roles in the Automotive Work Environment	3	3
5	K/601/6237	Knowledge of Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment	4	2
6	Y/601/6279	Skills in Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment	7	2
20	A/601/6338	Competency in Health, Safety and Good Housekeeping in the Automotive Environment	7	2
21	K/601/6366	Competency in Supporting Job Roles in the Automotive Work Environment	5	3
Group B – Mandatory specialist units Learners must achieve 57 credits from this group.				
7	F/601/5515	Knowledge of Routine Motorcycle Maintenance	2	2
10	Y/601/5519	Knowledge of Motorcycle Internal Engine Systems	3	2
11	T/601/5527	Knowledge of Motorcycle Fuel, Ignition, Air and Exhaust System Units and Components	3	2

Unit No.	Unit Reference No.	Unit Title	Credit	Level
13	H/601/5555	Knowledge of Removing and Replacing Motorcycle Electrical Units and Components	6	2
15	T/601/5558	Knowledge of Removing and Replacing Motorcycle Chassis Units and Components	6	2
Group B – Mandatory specialist units continued				
22	L/601/5484	Competency in Motorcycle Internal Engine Systems	10	2
23	K/601/5489	Competency in Removing and Replacing Motorcycle Electrical Units and Components	10	2
24	T/601/5494	Competency in Removing and Replacing Motorcycle Chassis Units and Components	10	2
25	D/601/5442	Competency in Routine Motorcycle Maintenance	7	2
Group C – Optional groups Learners must achieve a minimum of 9 credits from **one** of the Option Groups.				
Group C1 – Optional group 1 If this group is chosen, learners must achieve 10 credits from this group.				
17	R/601/6247	Knowledge of how to Identify and Agree Motor Vehicle Customer Service Needs	5	3
26	K/601/6383	Competency in Identifying and Agreeing Motor Vehicle Customer Service Needs	5	3
Group C2 – Optional group 2 If this group is chosen, learners must achieve 9 credits from this group.				
18	F/601/5563	Knowledge of Motorcycle Preparation and Inspection	2	2
27	J/601/5497	Competency in Motorcycle Preparation and Inspection	7	2

What is the qualification structure for the Edexcel BTEC Level 3 Diploma in Motorcycle Maintenance and Repair Principles (QCF)?

A minimum of 79 credits is required to achieve this qualification. 29 credits from the mandatory generic units in Group A, 40 credits from the mandatory specialist units in Group B and a minimum of 10 credits achieved by selecting one of the 2 option groups from Group C. All subcomponents of the chosen groups must be completed.

Individual units can be found in the *Units* section.

Unit No.	Unit Reference No.	Unit Title	Credit	Level
Group A – Mandatory generic units Learners must achieve 29 credits from this group.				
1	D/601/6171	Knowledge of Health, Safety and Good Housekeeping in the Automotive Environment	3	2
2	Y/601/7254	Skills in Health, Safety and Good Housekeeping in the Automotive Environment	7	2
3	J/601/6262	Skills in Supporting Job Roles in the Automotive Work Environment	5	3
4	T/601/6175	Knowledge of Support for Job Roles in the Automotive Work Environment	3	3
5	K/601/6237	Knowledge of Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment	4	2
6	Y/601/6279	Skills in Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment	7	2
Group B – Mandatory specialist units Learners must achieve 40 credits from this group.				
18	F/601/5563	Knowledge of Motorcycle Preparation and Inspection	2	2
19	Y/601/5617	Skills in Motorcycle Preparation and Inspection	2	2
28	R/601/5566	Knowledge of Diagnosis and Rectification of Motorcycle Engine Faults	6	3

Unit No.	Unit Reference No.	Unit Title	Credit	Level
29	T/601/5625	Skills In Diagnosing and Rectifying Motorcycle Engine Faults	5	3
30	D/601/5568	Knowledge in Diagnosis and Rectification of Motorcycle Chassis Faults	6	3
Group B – Mandatory specialist units continued				
31	Y/601/5634	Skills in Diagnosing and Rectifying Motorcycle Chassis System Faults	5	3
32	H/601/5636	Skills in Diagnosing and Rectifying Motorcycle Transmission Faults	3	3
33	L/601/5582	Knowledge of Diagnosis and Rectification of Motorcycle Transmission and Driveline Faults	4	3
34	K/601/5590	Skills in Diagnosing and Rectifying Motorcycle Electrical Faults	3	3
35	M/601/5512	Knowledge of Diagnosis and Rectification of Motorcycle Electrical Faults	4	3
Group C – Optional groups Learners must achieve a minimum of 10 credits from **one** of the Option Groups.				
Group C1 – Optional group 1 If this group is chosen, learners must achieve 10 credits from this group.				
16	M/601/6286	Skills to Identify and Agree Motor Vehicle Customer Service Needs	5	3
17	R/601/6247	Knowledge of how to Identify and Agree Motor Vehicle Customer Service Needs	5	3
Group C2 – Optional group 2 If this group is chosen, learners must achieve 10 credits from this group.				
36	T/601/6242	Knowledge of how to Make Learning Possible through Demonstrations and Instruction	5	3
37	Y/601/6282	Skills in how to Make Learning Possible through Demonstrations and Instruction	5	3

What is the qualification structure for the Edexcel Level 3 Diploma in Motorcycle Maintenance and Repair Competence (QCF)?

A minimum of 102 credits is required to achieve this qualification. 29 credits from the mandatory generic units in Group A, 63 credits from the mandatory specialist units in Group B and a minimum of 10 credits achieved by selecting one of the 2 option groups from Group C. All subcomponents of the chosen groups must be completed.

Individual units can be found in the *Units* section.

Unit No.	Unit Reference No.	Unit Title	Credit	Level
Group A – Mandatory generic units Learners must achieve 29 credits from this group.				
1	D/601/6171	Knowledge of Health, Safety and Good Housekeeping in the Automotive Environment	3	2
4	T/601/6175	Knowledge of Support for Job Roles in the Automotive Work Environment	3	3
5	K/601/6237	Knowledge of Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment	4	2
6	Y/601/6279	Skills in Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment	7	2
20	A/601/6338	Competency in Health, Safety and Good Housekeeping in the Automotive Environment	7	2
21	K/601/6366	Competency in Supporting Job Roles in the Automotive Work Environment	5	3
Group B – Mandatory specialist units Learners must achieve 63 credits from this group.				
18	F/601/5563	Knowledge of Motorcycle Preparation and Inspection	2	2
28	R/601/5566	Knowledge of Diagnosis and Rectification of Motorcycle Engine Faults	6	3
30	D/601/5568	Knowledge in Diagnosis and Rectification of Motorcycle Chassis Faults	6	3

Unit No.	Unit Reference No.	Unit Title	Credit	Level
33	L/601/5582	Knowledge of Diagnosis and Rectification of Motorcycle Transmission and Driveline Faults	4	3
27	J/601/5497	Competency in Motorcycle Preparation and Inspection	7	2
Group B – Mandatory specialist units continued				
38	F/601/5501	Competency in Diagnosing and Rectifying Motorcycle Engine Faults	10	3
39	L/601/5503	Competency in Diagnosing and Rectifying Motorcycle Chassis System Faults	10	3
40	K/601/5508	Competency in Diagnosing and Rectifying Motorcycle Transmission and Driveline faults	7	3
35	M/601/5512	Knowledge of Diagnosis and Rectification of Motorcycle Electrical Faults	4	3
41	Y/601/5441	Competency in Diagnosing and Rectifying Motorcycle Electrical Faults	7	3
Group C – Optional groups Learners must achieve a minimum of 10 credits from **one** of the Option Groups.				
Group C1 – Optional group 1 If this group is chosen, learners must achieve 10 credits from this group.				
17	R/601/6247	Knowledge of how to Identify and Agree Motor Vehicle Customer Service Needs	5	3
26	K/601/6383	Competency in Identifying and Agreeing Motor Vehicle Customer Service Needs	5	3
Group C2 – Optional group 2 If this group is chosen, learners must achieve 10 credits from this group.				
36	T/601/6242	Knowledge of how to Make Learning Possible through Demonstrations and Instruction	5	3
42	Y/601/6380	Competency in Making Learning Possible through Demonstrations and Instruction	5	3

How are the qualifications graded and assessed?

The overall grade for the qualifications is a 'pass'. The learner must achieve all the required units within the specified qualification structure.

To pass a unit the learner must:

- achieve **all** the specified learning outcomes
- satisfy **all** the assessment criteria by providing sufficient and valid evidence for each criterion
- show that the evidence is their own.

The qualifications are designed to be assessed:

- in the workplace or
- in conditions resembling the workplace, as specified in the assessment requirements/strategy for the sector, or
- as part of a training programme.

Assessment strategy for competence-based qualifications (VCQs)

The assessment strategy for the competence-based qualifications (VCQs) has been included in *Annexe C*. It has been developed by IMI in partnership with employers, training providers, awarding organisations and the regulatory authorities. The assessment strategy includes details on:

- criteria for defining realistic working environments
- roles and occupational competence of assessors, expert witnesses, internal verifiers and standards verifiers
- quality control of assessment
- evidence requirements.

Evidence of competence may come from:

- **current practice** where evidence is generated from a current job role
- a **programme of development** where evidence comes from assessment opportunities built into a learning/training programme whether at or away from the workplace
- the **Recognition of Prior Learning (RPL)** where a learner can demonstrate that they can meet the assessment criteria within a unit through knowledge, understanding or skills they already possess without undertaking a course of learning. They must submit sufficient, reliable and valid evidence for internal and standards verification purposes. RPL is acceptable for accrediting a unit, several units or a whole qualification
- a **combination** of these.

It is important that the evidence is:

Valid	relevant to the standards for which competence is claimed
Authentic	produced by the learner
Current	sufficiently recent to create confidence that the same skill, understanding or knowledge persist at the time of the claim
Reliable	indicates that the learner can consistently perform at this level
Sufficient	fully meets the requirements of the standards.

Types of evidence (to be read in conjunction with the assessment strategy in *Annexe C* and the assessment/evidence requirements guidance within individual Knowledge, Skills and Competence Units)

To successfully achieve a unit the learner must gather evidence which shows that they have met the required standard in the assessment criteria. Evidence can take a variety of different forms including the examples below. Centres should refer to the assessment strategy for information about which of the following are permissible.

Centres should also refer to the assessment strategy (for competence-based qualifications (VCQs)) and the assessment requirements/evidence requirements section within each individual unit.

- direct observation of the learner's performance by their assessor (O)
- outcomes from oral or written questioning (Q&A)
- products of the learner's work (P)
- personal statements and/or reflective accounts (RA)
- outcomes from simulation, where permitted by the assessment strategy (S)
- professional discussion (PD)
- assignment, project/case studies (A)
- authentic statements/witness testimony (WT)
- expert witness testimony (EWT)
- evidence of Recognition of Prior Learning (RPL).

The abbreviations may be used for cross-referencing purposes.

Learners can use one piece of evidence to prove their knowledge, skills and understanding across different assessment criteria and/or across different units. It is, therefore, not necessary for learners to have each assessment criterion assessed separately. Learners should be encouraged to reference the assessment criteria to which the evidence relates.

Evidence must be made available to the assessor, internal verifier and Edexcel standards verifier. A range of recording documents is available on the Edexcel website www.edexcel.com. Alternatively, centres may develop their own.

Centre recognition and approval

Centre recognition

Centres that have not previously offered Edexcel qualifications need to apply for and be granted centre recognition as part of the process for approval to offer individual qualifications. New centres must complete both a centre recognition approval application and a qualification approval application.

Existing centres will be given 'automatic approval' for a new qualification if they are already approved for a qualification that is being replaced by the new qualification and the conditions for automatic approval are met. Centres already holding Edexcel approval are able to gain qualification approval for a different level or different sector via Edexcel online.

Approvals agreement

All centres are required to enter into an approvals agreement which is a formal commitment by the head or principal of a centre to meet all the requirements of the specification and any linked codes or regulations. Edexcel will act to protect the integrity of the awarding of qualifications, if centres do not comply with the agreement. This could result in the suspension of certification or withdrawal of approval.

Quality assurance

Quality assurance is at the heart of vocational qualifications. Assessment on BTEC and Competency qualifications is completed by your centre. You use quality assurance to ensure that your managers, internal verifiers and assessors are standardised and supported. We use quality assurance to check that all centres are working to national standards. It gives us the opportunity to identify and provide support where it is needed in order to safeguard certification. It also allows us to recognise and support good practice.

For the qualifications in this specification, the Edexcel quality assurance model will follow one of the three processes listed below.

1 Delivery of the **Competence and Principles** qualifications as part of a BTEC apprenticeship (single click registration)

- integrated annual visits by a Standards Verifier to review centre-wide quality assurance systems and sampling of internal verification and assessor decisions

2 Delivery of the **Competence** qualification outside the apprenticeship

- annual visits to centres by a Centre Quality Reviewer to review centre-wide quality assurance systems
- annual visits by a Standards Verifier for sampling of internal verification and assessor decisions for the qualification

3 Delivery of the **Principles** qualification outside the apprenticeship

- annual visits to centres by a Centre Quality Reviewer to review centre-wide quality assurance systems
- Lead Internal Verifier accreditation. This involves online training and standardisation of Lead Internal Verifiers using our OSCA platform, accessed via Edexcel Online. Please note that not all qualifications are covered by Lead Internal Verifier accreditation. Where this is the case we will annually allocate a Standards Verifier to conduct postal sampling of internal verification and assessor decisions for the Principal Subject Area.

For further details, go to the UK BTEC Quality Assurance Handbook 2011-12 http://www.edexcel.com/quals/BTEC/quality/Pages/documents.aspx

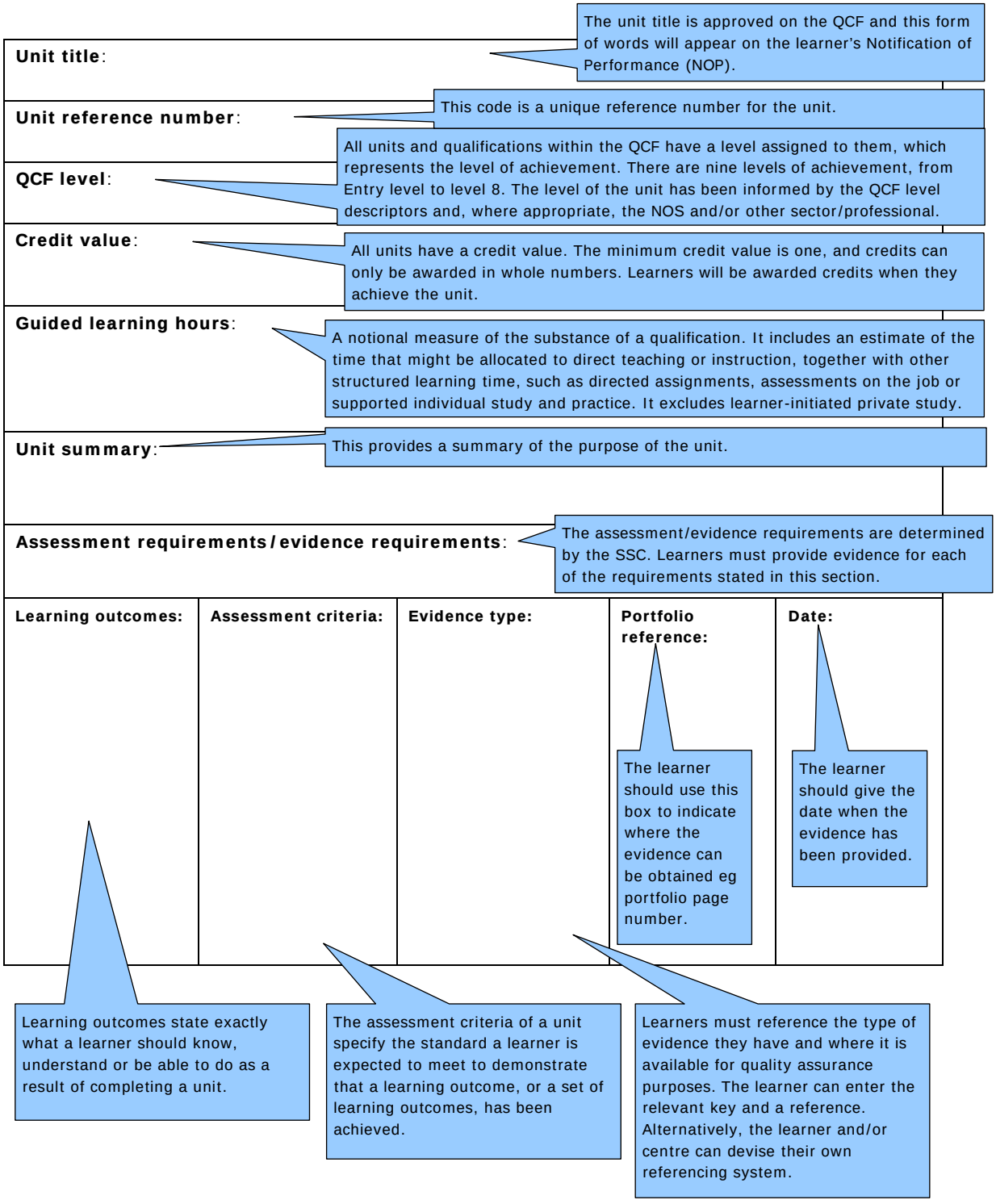
What resources are required?

Each qualification is designed to support learners working in the automotive sector. Physical resources need to support the delivery of the qualifications and the assessment of the learning outcomes and must be of industry standard.

For competence based qualifications (VCQs), centres must meet any specific resource and staff requirements outlined in *Annexe C: Assessment strategy*.

Unit format

Each unit in this specification contains the following sections.



Units

Unit 1: Knowledge of Health, Safety and Good Housekeeping in the Automotive Environment

Unit reference number: D/601/6171

QCF level: 2

Credit value: 3

Guided learning hours: 30

Unit Summary

This unit enables the learner to develop an understanding of:

- routine maintenance and cleaning of the automotive environment and using resources economically
- health and safety legislation and duties of everyone in the motor vehicle environment. It will provide an appreciation of significant risks in the automotive environment and how to identify and deal with them. Once completed the learner will be able to identify hazards and evaluate and reduce risk.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Knowledge Unit Syllabus as set out below:

Economic use of Resources

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

Requirement to maintain work area effectively

a cleaning tools and equipment to maximise workplace efficiency

b requirement to carry out the housekeeping activities safely and in a way that minimises inconvenience to customers and staff

c risks involved when using solvents and detergents

d advantages of good housekeeping

Spillages, leaks and waste materials

a relevance of safe systems of work to the storage and disposal of waste materials

b requirement to store and dispose of waste, used materials and debris correctly

c safe disposal of special/hazardous waste materials

d advantages of recycling waste materials

e dealing with spillages and leaks

Basic legislative requirements

a Provision and Use of Work Equipment Regulations 1992

b Power Presses Regulations 1992

c Pressure Systems and Transportable Gas Containers Regulations 1989

d Electricity at Work Regulations 1989

e Noise at Work Regulations 1989

f Manual Handling Operations Regulations 1992

g Health and Safety (Display Screen Equipment) Regulations 1992

h Abrasive Wheel Regulations

i Safe Working Loads

j Working at Height Regulations (date)

Routine maintenance of the workplace

a trainees personal responsibilities and limits of their authority with regard to work equipment

b risk assessment of the workplace activities and work equipment

c workplace person responsible for training and maintenance of workplace equipment

d when and why safety equipment must be used

e location of safety equipment

f particular hazards associated with their work area and equipment

g prohibited areas

h plant and machinery that trainees must **not** use or operate

i why and how faults on unsafe equipment should be reported

j storing tools, equipment and products safely and appropriately

k using the correct PPE

l following manufacturers recommendations

m location of routine maintenance information eg electrical safety check log

Legislation relevant to Health and Safety

a HASAWA

b COSHH

c EPA

d Manual Handling Operations Regulations 1992

e PPE Regulations 1992

General regulations to include an awareness of:

a Health and Safety (Display Screen Equipment) Regulations 1992

b Health and Safety (First Aid) Regulations 1981

c Health and Safety (Safety Signs and Signals) Regulations 1996

d Health and Safety (Consultation with Employees) Regulations 1996

e Employers Liability (Compulsory Insurance) Act 1969 and Regulations 1998

f Confined Spaces Regulations 1997

g Noise at Work Regulations 1989

h Electricity at Work Regulations 1989

i Electricity (Safety) Regulations 1994

j Fire Precautions Act 1971

k Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1985

l Pressure Systems Safety Regulations 2000

m Waste Management 1991

n Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002

o Control of Asbestos at Work Regulations 2002

Legislative duties

a the purpose of a Health and Safety Policy

b the relevance of the Health and Safety Executive

c The relevance of an initial induction to Health and Safety requirements at your workplace

d general employee responsibilities under the HASAWA and the consequences of non-compliance

e general employer responsibilities under the HASAWA and the consequences of non-compliance

f the limits of authority with regard to Heath and Safety within a personal job role

g workplace procedure to be followed to report Health and Safety matters

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

a accessing and interpreting safety information

b seeking advice when needed

c seeking assistance when required

d reporting of unsafe equipment

e storing tools, equipment and products safely and appropriately

f using the correct PPE

g following manufacturers recommendations

h following application procedures eg hazardous substances

i the correct selection and use of extraction equipment

PPE to include:

a typical maintenance procedures for PPE equipment to include:

- i typical maintenance log
- ii cleaning procedures
- iii filter maintenance
- iv variation in glove types
- v air quality checks

b choice and fitting procedures for masks and air breathing equipment.

c typical workplace processes which would require the use of PPE to include:

- i welding
- ii sanding and grinding
- iii filling
- iv panel removal and replacement
- v drilling
- vi cutting
- vii chiselling
- viii removal of broken glass
- ix removal of rubber seals from fire damaged vehicles
- x removal of hypodermic needles
- xi servicing activities
- xii roadside recovery

d unserviceable PPE.

e PPE required for a range automotive repair activities. To include appropriate protection of:

- i eyes
- ii ears
- iii head
- iv skin
- v feet
- vi hands
- vii lungs

Fire and extinguishers

a classification of fire types

b using a fire extinguisher effectively
types of Extinguishers

- i foam
- ii dry powder
- iii CO2
- iv water
- v fire blanket

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

a the procedure as:

- i raise the alarm
- ii fight fire only if appropriate
- iii evacuate building
- iv call for assistance

Product warning labels to include:

a reasons for placing warning labels on containers.

b warning labels in common use, to include:

- i toxic
- ii corrosive
- iii poisonous
- iv harmful
- v irritant
- vi flammable
- vii explosive

Warning signs and notices

a colours used for warning signs:

- i red
- ii blue
- iii green

b shapes and meaning of warning signs:

- i round
- ii triangular
- iii square

c The meaning of prohibitive warning signs in common use

d The meaning of mandatory warning signs in common use

e The meaning of warning notices in common use

f General design of safe place warning sign

Hazards and risks to include:

a the difference between a risk and a hazard.

b potential risks resulting from:

- i the use and maintenance of machinery or equipment
- ii the use of materials or substances
- iii accidental breakages and spillages
- iv unsafe behaviour
- v working practices that do not conform to laid down policies
- vi environmental factors
- vii personal presentation
- viii unauthorised personal, customers, contractors etc entering your work premises
- ix working by the roadside
- x vehicle recovery

c the employee's responsibilities in identifying and reporting risks within their working environment

d the method of reporting risks that are outside your limits of authority

e potential causes of:

- i fire
- ii explosion
- iii noise
- iv harmful fumes
- v slips
- vi trips
- vii falling objects
- viii accidents whilst dealing with broken down vehicles

Personal responsibilities

a the purpose of workplace polices and procedures on:

- i the use of safe working methods and equipment
- ii the safe use of hazardous substances
- iii smoking, eating, drinking and drugs
- iv emergency procedures
- v personal appearance

b the importance of personal appearance in the control of health and safety

Action to be taken in the event of colleagues suffering accidents

a the typical sequence of events following the discovery of an accident such as:
   i make the area safe
   ii remove hazards if appropriate ie switch off power
   iii administer minor first aid
   iv take appropriate action to re-assure the injured party
   v raise the alarm
   vi get help
   vii report on the accident

b typical examples of first aid which can be administered by persons at the scene of an accident:
   i check for consciousness
   ii stem bleeding
   iii keep the injured person's airways free
   iv place in the recovery position if injured person is unconscious
   v issue plasters for minor cuts
   vi action to prevent shock ie keep the injured party warm
   vii administer water for minor burns or chemical injuries
   viii wash eyes with water to remove dust or ingress of chemicals (battery acid)
   ix need to seek professional help for serious injuries

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

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand the correct personal and vehicle protective equipment to be used within the automotive environment	1.1	explain the importance of wearing the types of PPE required for a range automotive repair activities			
		1.2	identify vehicle protective equipment for a range of repair activities			
		1.3	describe vehicle and personal safety considerations when working at the roadside			
2	Understand effective housekeeping practices in the automotive environment	2.1	describe why the automotive environment should be properly cleaned and maintained			
		2.2	describe requirements and systems which may be put in place to ensure a clean automotive environment			
		2.3	describe how to minimise waste when using utilities and consumables			
		2.4	state the procedures and precautions necessary when cleaning and maintaining an automotive environment			
		2.5	describe the selection and use of cleaning equipment when dealing with general cleaning, spillages and leaks in the automotive environment			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
3	Understand key health and safety requirements relevant to the automotive environment	3.1	list the main legislation relating to automotive environment health and safety			
		3.2	describe the general legal duties of employers and employees required by current health and safety legislation			
		3.3	describe key, current health and safety requirements relating to the automotive environment			
		3.4	describe why workplace policies and procedures relating to health and safety are important			
4	Understand about hazards and potential risks relevant to the automotive environment	4.1	identify key hazards and risks in an automotive environment			
		4.2	describe policies and procedures for reporting hazards, risks, health and safety matters in the automotive environment			
		4.3	state precautions and procedures which need to be taken when working with vehicles, associated materials, tools and equipment			
		4.4	identify fire extinguishers in common use and which types of fire they should be used on			
		4.5	identify key warning signs and their characteristics that are found in the vehicle repair environment			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		4.6	state the meaning of common product warning labels used in an automotive environment			
5	Understand personal responsibilities	5.1	explain the importance of personal conduct in maintaining the health and safety of the individual and others			
		5.2	explain the importance of personal presentation in maintaining health safety and welfare			

Learner name: _____ Date:_____

Learner signature: _____ Date:_____

Assessor signature: _____ Date:_____

Internal verifier signature: _____ Date:_____
(*if sampled*)

Unit 2: Skills in Health, Safety and Good Housekeeping in the Automotive Environment

Unit reference number: Y/601/7254

QCF level: 2

Credit value: 7

Guided learning hours: 60

Unit Summary

This unit will enable the learner to develop the skills required to:

- carry out day to day work area cleaning, clearing away, dealing with spillages and disposal of waste, used materials and debris
- identify hazards and risks in the automotive environment and complying with relevant legislation and good practice
- work safely at all times within the automotive environment, both as an individual and with others.

Assessment Requirements/Evidence requirements:

This unit must adhere to the IMI Skills Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre

3 be observed by an assessor as defined by the IMI Assessment Strategy

4 produce evidence of use of personal and vehicle protection, cleaning the work environment and disposal of waste on **2** separate **occasions**

5 produce evidence of identifying risks which may result from at least **2** of the items listed below:

- the use and maintenance of machinery or equipment
- the use of materials or substances
- working practices which do not conform to laid down policies
- unsafe behaviour
- accidental breakages and spillages
- environmental factors

6 produce evidence of identifying risks

7 produce evidence of following at least **2** of the workplace policies listed below:

- the use of safe working methods and equipment
- the safe use of hazardous substances
- smoking, eating, drinking and drugs
- what to do in the event of an emergency
- personal presentation

8 produce evidence of following workplace policies

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to use correct personal and vehicle protection within the automotive environment	1.1	select and use personal protective equipment throughout activities. To include appropriate protection of: a eyes b ears c head d skin e feet f hands g lungs			
		1.2	select and use vehicle protective equipment throughout all activities			
2	Be able to carry out effective housekeeping practices in the automotive environment	2.1	select and use cleaning equipment which is of the right type and suitable for the task			
		2.2	use utilities and appropriate consumables, avoiding waste			
		2.3	use materials and equipment to carry out cleaning and maintenance duties in allocated work areas, following automotive work environment policies, schedules and manufacturers instructions			
		2.4	perform housekeeping activities safely and in a way which minimizes inconvenience to customers and staff			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		2.5	keep the work area clean and free from debris and waste materials			
		2.6	keep tools and equipment fit for purpose by regular cleaning and keeping tidy			
		2.7	dispose of used cleaning agents, waste materials and debris to comply with legal and workplace requirements			
3	Be able to recognise and deal with dangers in order to work safely within the automotive workplace	3.1	name and locate the responsible persons for health and safety in their relevant workplace			
		3.2	identify and report working practices and hazards which could be harmful to themselves or others			
		3.3	carry out safe working practices whilst working with equipment, materials and products in the automotive environment			
		3.4	rectify health and safety risks encountered at work, within the scope and capability of their job role			
4	Be able to conduct themselves responsibly	4.1	show personal conduct in the workplace which does not endanger the health and safety of themselves or others			
		4.2	display suitable personal presentation at work which ensures the health and safety of themselves and others at work			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 3: Skills in Supporting Job Roles in the Automotive Work Environment

Unit reference number: J/601/6262

QCF level: 3

Credit value: 5

Guided learning hours: 40

Unit Summary

This unit will help the learner develop the skills required to keep good working relationships with all colleagues and customers in the automotive work environment by using effective communication and support.

Assessment Requirements/Evidence requirements:

This unit must adhere to the IMI Skills Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre

3 be observed by an assessor as defined by the IMI Assessment Strategy

4 produce witness testimony from your peers **and** supervisor **or** tutor that you have worked well with others

5 produce evidence carrying out the above whilst performing your normal duties

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work effectively within the organisational structure of the automotive work environment	1.1	respond promptly and willingly to requests for assistance from customers and colleagues			
		1.2	refer customers and colleagues to the correct person should requests fall outside their responsibility and capability			
2	Be able to obtain and use information in order to support their job role within the automotive work environment	2.1	select and use legal and technical information, in an automotive work environment			
3	Be able to communicate with and support colleagues and customers effectively within the automotive work environment	3.1	use methods of communication with customers and colleagues which meet their needs			
		3.2	give customers and colleagues accurate information			
		3.3	make requests for assistance from or to customers and colleagues clearly and courteously			
4	Be able to develop and keep good working relationships in the automotive work environment	4.1	contribute to team work by initiating ideas and co-operating with customers and colleagues			
		4.2	treat customers and colleagues in a way which shows respect for their views and opinions			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		4.3	make and keep achievable commitments to customers and colleagues			
		4.4	inform colleagues promptly of anything likely to affect their own work			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 4: Knowledge of Support for Job Roles in the Automotive Work Environment

Unit reference number: T/601/6175

QCF level: 3

Credit value: 3

Guided learning hours: 20

Unit Summary

This unit enables the learner to develop an understanding of how to keep good working relationships with all colleagues in the automotive work environment by using effective communication and support skills.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Knowledge Unit Syllabus as set out below:

The structure of a typical vehicle repair business

a how these areas relate to each other within the business
   - i body shop
   - ii vehicle repair workshop
   - iii paint shop
   - iv valeting
   - v vehicle parts store
   - vi main office
   - vii vehicle sales
   - viii reception

b sources of information
   - i other staff
   - ii manuals
   - iii parts lists
   - iv computer software and the internet
   - v manufacturer
   - vi diagnostic equipment

Communication requirements when carrying out vehicle repairs

a locating and using correct documentation and information for:
   i recording vehicle maintenance and repairs
   ii vehicle specifications
   iii component specifications
   iv oil and fluid specifications
   v equipment and tools
   vi identification codes

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

Methods of Communication

a verbal
b signs and notices
c memos
d telephone
e electronic mail
f vehicle job card
g notice boards
h SMS text messaging
i letters

Organisational and Customer requirements:

a importance of time scales to customer and organization
b relationship between time and costs
c meaning of profit

Choice of Communication

a distance
b location
c job responsibility

Importance of maintaining positive working relationships:

a morale
b productivity
c company image
d customer relationships
e colleagues

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand key organisational structures, functions and roles within the automotive work environment	1.1	identify the purpose of different sections of a typical automotive work environment			
		1.2	explain organisational structures and lines of communication within the automotive work environment			
		1.3	explain levels of responsibility within specific job roles in automotive workplace. To include: a trainee b skilled technician c supervisor d manager			
2	Understand the importance of obtaining, interpreting and using information in order to support their job role within the automotive work environment	2.1	explain the importance of different sources of information in a automotive work environment			
		2.2	explain how to find, interpret and use relevant sources of information			
		2.3	describe the main legal requirements relating to the vehicle, including road safety requirements			
		2.4	explain the importance of working to recognised procedures and processes			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		2.5	explain when replacement units and components must meet the manufacturers' original equipment specification			
		2.6	explain the purpose of how to use identification codes			
3	Understand the importance of different types of communication within the automotive work environment	3.1	explain where different methods of communication would be used within the automotive environment			
		3.2	explain the factors which can determine your choice of communication			
		3.3	explain how the communication of information can change with the target audience to include uninformed and informed people			
4	Understand communication requirements when carrying out vehicle repairs in the automotive work environment	4.1	explain how to report using written and verbal communication			
		4.2	explain the importance of documenting information relating to work carried out in the automotive environment			
		4.3	explain the importance of working to agreed timescales			
5	Understand how to develop good working relationships with colleagues and customers in the automotive workplace	5.1	describe how to develop positive working relationships with colleagues and customers			
		5.2	explain the importance of developing positive working relationships			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		5.3	explain the importance of accepting other peoples' views and opinions			
		5.4	explain the importance of making and honouring realistic commitments to colleagues and customers			

Learner name: _____ Date: _____

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Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 5: Knowledge of Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment

Unit reference number: K/601/6237

QCF level: 2

Credit value: 4

Guided learning hours: 40

Unit Summary

This unit enables the learner to develop an understanding of:

- the correct selection, care and use of key hand tools and measuring devices for modification, fabrication and repair in the automotive environment
- the correct preparation and use of common automotive environment equipment
- the correct selection and fabrication of materials used when modifying and repairing
- the correct application of automotive engineering fabrication and fitting principles.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Knowledge Unit Syllabus as set out below:

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

a files

b hacksaws and snips

c hammers

d screwdrivers

e pliers

f spanners

g sockets

h punches

i types of drill and drill bits

j taps and dies

k stud removers

l marking out tools

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

a rule/tape

b callipers

c feeler gauge

d volume measures

e micrometer

f dial gauges

g torque wrenches

h depth gauges

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

a ammeter

b voltmeter

c ohmmeter

d multi-meter

Common electrical terms when measuring:

a voltage

b current

c resistance

Workshop equipment (including appropriate PPE). To include:

a hydraulic jacks

b axle stands

c pillar drills

d air tools

e vehicle lifts

f cranes

g hoists

h electrical power tools

Properties, application and limitations (to include safe use) of ferrous and non-ferrous metals used when constructing, modifying and repairing vehicles and components. Materials to include:

a carbon steels

b alloy steels

c cast iron

d aluminium alloys

e brass

f copper

g lead

Properties, application and limitations (to include safe use) of non-metallic materials used when constructing, modifying and repairing vehicles and components. Materials to include:

a glass

b plastics (inc. GRP)

c Kevlar

d rubber

Terms relating to the properties of materials. To include:

a hardness

b toughness

c ductility

d elasticity

e tenacity

f malleability

g plasticity

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand how to select, use and care for hand tools and measuring devices in the automotive environment	1.1	identify and explain the use of common types of hand tools used for fabricating and fitting in the automotive environment			
		1.2	identify and explain the use of common measuring devices used for fabrication and fitting in the automotive environment			
		1.3	describe, within the scope of their responsibilities, how to select, prepare and maintain hand tools, measuring devices and PPE used for fabrication, repair and fitting in the automotive environment			
		1.4	state the limitations of common hand tools and measuring devices used for fabricating, repair and fitting in the automotive workplace			
		1.5	explain how common hand tools and measuring devices used for fabricating, repair and fitting in the automotive environment should be stored and maintained			
		1.6	identify common electrical measuring tools used in the repair of vehicles and components			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		1.7	explain the preparation and safe and correct use of common electrical tools when measuring voltage, current and resistance			
2	Understand how to prepare and use common workshop equipment	2.1	describe the preparation and safe use of workshop equipment			
		2.2	explain the term: safe working load			
3	Understand how to select materials when fabricating, modifying and repairing vehicles and fitting components	3.1	describe the properties, application and limitations of ferrous and non-ferrous metals, including their safe use			
		3.2	describe the properties, application and limitations of common non-metallic materials, including their safe use			
		3.3	define common terms relating to the properties of materials			
4	Understand how to apply automotive engineering, fabrication and fitting principles when modifying and repairing vehicles and components	4.1	describe how to tap threads, file, cut and drill plastics and metals when modifying or repairing vehicles			
		4.2	describe how to measure, mark out, shape and join materials when fabricating			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		4.3	describe the selection and fitting procedures of the following: a gaskets and seals b sealants and adhesives c fittings and fasteners d electrical circuit components			
		4.4	identify locking, fastening and fixing devices			
		4.5	state the importance of correct operating specifications for limits, fits and tolerances in the automotive environment			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 6: Skills in Materials, Fabrication, Tools and Measuring Devices used in the Automotive Environment

Unit reference number: Y/601/6279

QCF level: 2

Credit value: 7

Guided learning hours: 60

Unit Summary

This unit helps the learner to develop the skills required for:

- the correct selection, care and use of key hand tools and measuring devices for modification, fabrication and repair in the automotive environment
- the correct preparation and use of common work environment equipment
- the correct selection and fabrication of materials used when modifying and repairing
- the correct application of automotive engineering fabrication and fitting principles.

Assessment Requirements/Evidence requirements:

If this unit is offered within a competence qualification (VCQ) it must be assessed in accordance with the IMI Assessment Strategy (*Annexe C*).

This unit must adhere to the IMI Skills Unit Assessment Requirements as set out below:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre

3 be observed by an assessor as defined by the IMI Assessment Strategy

4 produce evidence of undertaking basic routine checks of hand tools, measuring devices and workshop equipment covering all of those listed below:

- electrical
- mechanical
- pneumatic
- hydraulic

5 produce evidence of fabricating **at least 1 item** from suitable materials to known tolerances, which includes the following processes:

- filing
- tapping threads
- cutting
- drilling
- joining

6 be observed by your assessor carrying out routine checks and during stages of fabrication

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to select, maintain and use and hand tools and measuring devices in the automotive environment	1.1	select, maintain and use suitable hand tools safely when fabricating and fitting in the automotive workplace			
		1.2	select, maintain and use suitable measuring devices safely when fabricating and fitting in the automotive environment			
		1.3	select, maintain and use suitable PPE for fabrication, repair and fitting in the automotive environment			
		1.4	select, maintain and use suitable electrical measuring tools safely when repairing vehicles and components			
2	Be able to prepare and use common workshop equipment	2.1	use suitably maintained workshop equipment safely			
		2.2	use correct interpretation of 'safe working load' on lifting and supporting equipment			
		2.3	report any faulty or damaged tools and equipment to the relevant persons clearly and promptly			
		2.4	store work tools and equipment in a safe manner which permits ease of access and identification for use			
3	Be able to select materials when fabricating, modifying and repairing vehicles and fitting components	3.1	select and use appropriate materials whilst constructing, fitting, modifying or repairing vehicles and components			

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

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 7: Knowledge of Routine Motorcycle Maintenance

Unit reference number: F/601/5515

QCF level: 2

Credit value: 2

Guided learning hours: 20

Unit Summary

This unit enables the learner to develop an understanding of conducting routine maintenance, adjustment and replacement activities as part of the periodic servicing of motorcycles.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Knowledge Unit Syllabus as set out below:

Motorcycle maintenance, inspection and adjustment and record findings Motorcycle inspection techniques used in routine maintenance including:

a aural

b visual and functional assessments on engine systems

c visual and functional assessments on transmission power train

d chassis systems

e wheels and tyres

f electrical and electronic systems

g motorcycle fame and components

The procedures used for inspecting the condition and serviceability of the following:

a filters

b drive belts

c cables

d brake linings

e pads

f ignition components

g hoses

h tyres

i lights

j chain and sprockets

k steering and suspension

l battery and charging

The procedures used for checking gaps and clearances:

a ignition components

b carburettor

c valve clearances

d clutch

e drive train

f brakes

Preparation and use appropriate use of equipment to include:

a test instruments

b emission equipment

c wheel alignment

d beam setting equipment

e tyre tread depth gauges

Procedures for checking and replenishing fluid levels:

a oil

b water

c hydraulic fluids

d greases

Procedures for checking and replacement of lubricants:

a replace oil filters

b check levels

c types of oil

d cleanliness

e disposal of old oil and filters

Procedures for carrying out adjustments on motorcycle systems or components:

a clearances

b settings

c alignment

d operational performance (engine idle, exhaust gas)

Procedures for checking electrical systems:

a operation

b security

c performance

Importance and process of detailed inspection procedures:

a following inspection checklists

b checking conformity to manufacturer's specifications

c UK and European legal requirements

Importance and process of completing all relevant documentation relating to motorcycle maintenance:

a inspection records

b job cards

c motorcycle repair records

d motorcycle service history

The need to use motorcycle protection prior to service and repair requirements and methods used for protecting:

a motorcycle body panels

b paint surfaces

c chrome surfaces

The need to check the motorcycle prior to routine maintenance
The need to inspect the motorcycle following routine maintenance:

a professional presentation of motorcycle

b customer perceptions

The basic checks of motorcycle following routine maintenance:

a removal of oil and grease marks

b body panels

c chrome

d paint surfaces

e motorcycle controls

f re-instatement of components

Different systems to be inspected while carrying out motorcycle routine maintenance

a engine and power train systems

b chassis systems

c wheels and tyres

d electrical and electronic systems

e motorcycle frame and components

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand how to carry out routine motorcycle maintenance	1.1	explain how to conduct a scheduled motorcycle routine examination and assessment against the motorcycle manufacturers specification, legal and road safety requirements			
		1.2	identify the different systems to be inspected while carrying out motorcycle routine maintenance			
		1.3	identify adjustments that need to be carried out on a motorcycle routine maintenance			
2	Understand the procedures required to carry out routine motorcycle maintenance	2.1	describe the procedures used for checking the condition and serviceability of motorcycle units and components			
		2.2	describe the procedures used for checking gaps and clearances			
		2.3	describe the procedures for checking and replenishing fluid levels			
		2.4	describe the procedures for checking and replacing lubricants			
		2.5	explain the procedure for reporting cosmetic damage to motorcycle components and units outside normal service items			
		2.6	identify the operating specifications for the systems being checked while carrying out motorcycle routine maintenance			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 8: Skills in Routine Motorcycle Maintenance

Unit reference number: F/601/5594

QCF level: 2

Credit value: 2

Guided learning hours: 20

Unit Summary

This unit allows the learner to develop skills they can carry out motorcycle routine maintenance, adjustments and replacement activities as part of the periodic servicing of motorcycles.

Assessment Requirements/Evidence requirements:

This unit must adhere to the IMI Skills Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre

3 be observed by an assessor as defined by the IMI Assessment Strategy

4 be observed by your assessor successfully carrying out servicing activities on **at least 1 vehicles** which collectively covers the Learning Outcomes

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work safely when carrying out motorcycle routine maintenance	1.1	use suitable personal protective equipment and motorcycle coverings throughout all motorcycle routine maintenance activities			
		1.2	work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment			
2	Be able to use relevant information to carry out the task	2.1	select suitable sources of technical information to support motorcycle routine maintenance activities including: a motorcycle technical data b maintenance procedures c legal requirements			
		2.2	use technical information to support motorcycle inspection activities			
3	Be able to use appropriate tools and equipment	3.1	select the appropriate tools and equipment necessary for carrying out routine maintenance			
		3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements			
		3.3	use the correct tools and equipment in the way specified by manufacturers when carrying out routine maintenance			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to carry out motorcycle routine maintenance	4.1	carry out motorcycle inspections using prescribed methods, adhering to the correct specifications and tolerances for the motorcycle and following: a the manufacturer's approved inspection methods b recognised researched inspection methods c health and safety requirements			
		4.2	carry out adjustments, replacement of motorcycle components and replenishment of consumable materials following the manufacturer's current specification			
		4.3	ensure the examination methods identify accurately any motorcycle system and or component problems falling outside the maintenance schedule are specified			
		4.4	ensure that the inspected motorcycle conforms to the motorcycle operating specification and any legal requirements			
		4.5	use suitable testing methods to evaluate the performance of all replaced and adjusted components and systems accurately			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
5	Be able to record information and make suitable recommendations	5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required			
		5.2	make suitable and justifiable recommendations for cost effective repairs			
		5.3	record and report any additional faults noticed during the course of their work promptly in the format required			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 9: Skills in Motorcycle Internal Engine Systems

Unit reference number: R/601/5597

QCF level: 2

Credit value: 5

Guided learning hours: 45

Unit Summary

This unit allows the learner to develop skills to remove and replace motorcycle engine power train mechanical, lubrication, cooling systems, clutch and transmission systems.

Assessment Requirements/Evidence requirements:

This unit must adhere to the Skills Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre

3 be observed by an assessor as defined by the IMI Assessment Strategy

4 be observed by your assessor successfully carrying out the removal and replacement of engine mechanical units and components from **3 different systems out of the 6 listed below:**

- cooling systems
- air supply and exhaust systems
- fuel and ignition systems
- lubrication systems (not including standard external filters)
- transmission systems
- clutch systems

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work safely when carrying out removal and replacement activities	1.1	use suitable personal protective equipment and motorcycle coverings throughout all light motorcycle routine maintenance activities			
		1.2	work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment			
2	Be able to use relevant information to carry out the task	2.1	select suitable sources of technical information to support motorcycle engine power train unit and component removal and replacement activities including: a motorcycle technical data b removal and replacement procedures c legal requirements			
		2.2	use technical information to support motorcycle engine power train unit and component removal and replacement activities			
3	Be able to use appropriate tools and equipment	3.1	select the appropriate tools and equipment necessary for removal and replacement of motorcycle engine power train systems			
		3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements			
		3.3	use the correct tools and equipment in the way specified by manufacturers to remove and replace light motorcycle engine systems			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to carry out removal and replacement of motorcycle electrical units and components.	4.1	remove and replace the motorcycle electrical systems and components, adhering to the correct specifications and tolerances for the motorcycle and following: a the manufacturer's approved and workplace removal and replacement methods b recognised researched repair methods c health and safety requirements			
		4.2	check that replaced motorcycle electrical units and components conform to the motorcycle operating specification and any legal requirements			
		4.3	use suitable testing methods to evaluate the performance of the reassembled system			
		4.4	ensure that the reassembled motorcycle electrical systems performs to the motorcycle operating specification and meets any legal requirements			
5	Be able to record information and make suitable recommendations	5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required			
		5.2	make suitable and justifiable recommendations for cost effective repairs			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		5.3	record and report any additional faults noticed during the course of their work promptly in the format required			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 10: Knowledge of Motorcycle Internal Engine Systems

Unit reference number: Y/601/5519

QCF level: 2

Credit value: 3

Guided learning hours: 20

Unit Summary

This unit enables the learner to develop an understanding of the construction and operation of common engine power train mechanical, lubrication and cooling systems, clutch and transmission systems.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Knowledge Unit Syllabus as set out below:

Engines

a engine types and configurations:
   i inline
   ii flat
   iii vee
   iv four-stroke and two-stroke cycle for spark ignition engines
   v naturally aspirated and turbo-charged engines

b relative advantages and disadvantages of different engine types and configurations

c engine components and layouts:
   i single (OHC) and multi camshaft (DOHC)
   ii single and multi cylinder (2, 3, 4, 6 cylinder types)
   iii port design: inlet, transfer and exhaust

d cylinder head layout and design, combustion chamber and piston design

e the procedures used when inspecting engines

f the procedures to assess:
   i serviceability
   ii wear

iii condition
iv clearances
v settings
vi linkages
vii joints
viii fluid systems
ix adjustments
x operation and functionality
xi security

g symptoms and faults associated with mechanical engine operation:
i poor performance
ii abnormal or excessive mechanical noise
iii erratic running
iv low power
v exhaust emissions
vi abnormal exhaust smoke
vii unable to start
viii exhaust gas leaks to cooling system
ix exhaust gas leaks

Lubrication

a the advantages and disadvantages of wet and dry systems
b engine lubrication system:
i splash and pressurised systems
ii pumps
iii pressure relief valve
iv filters
v oil ways
vi oil coolers
c terms associated with lubrication and engine oil:
i full-flow
ii hydrodynamic
iii boundary
iv viscosity
v multi-grade
vi natural and synthetic oil

vii viscosity index

viii multi-grade

d the requirements and features of engine oil:

i operating temperatures

ii pressures

iii lubricant grades

iv viscosity

v multi-grade oil

vi additives

vii detergents

viii dispersants

ix anti-oxidants inhibitors

x anti-foaming agents

xi anti-wear

xii synthetic oils

xiii organic oils

xiv mineral oils

e symptoms and faults associated with lubrication systems:

i excessive oil consumption

ii oil leaks

iii oil in water

iv low or excessive pressure

v oil contamination

f the procedures used when inspecting lubrication system

Cooling

a the components, operating principles, and functions of engine cooling systems

b procedures used to remove, replace and adjust cooling system components

i cooling fans and control devices

ii fins and cowlings

iii header tanks, radiators and pressure caps

iv expansion tanks hoses, clips and pipes

v thermostats impellers and coolant

c the preparation and method of use of appropriate specialist equipment used to evaluate system performance following component replacement
   i system pressure testers
   ii pressure cap testers
   iii anti-freeze testing equipment
   iv chemical tests for the detection of combustion gas
d symptoms and faults associated with cooling systems:
   i water leaks
   ii water in oil
   iii blocked fins
   iv excessively low or high coolant temperature
e the procedures used when inspecting
   i cooling systems

Clutch

a the components, operating principles, and functions of clutch's
   i wet clutch
   ii dry clutch
   iii centrifugal
   iv cable control
   v hydraulic control
b procedures used to remove, replace and adjust clutch systems and components
c the preparation and method of use of appropriate specialist equipment used to evaluate system performance following component replacement
d symptoms and faults associated with clutch systems
   i slip
   ii drag

Transmission

a the components, operating principles, and function of transmission systems
   i conventional gear
   ii CVT
   iii automatic
b the operating components within transmission systems
   i gears
   ii shafts
   iii selectors

iv shift lever and drum mechanisms

v bearings

vi pulleys

c the preparation and method of use of appropriate specialist equipment used to evaluate transmission system performance following component replacement

d procedures used to remove, replace and adjust transmission systems and components

e symptoms and faults associated with transmission systems

i abnormal noises

ii vibration

iii fluid leaks

iv wear

v gear selection

General

a the preparation, testing and use of tools and equipment used for:

i dismantling

ii removal and replacement of engine mechanical and power train system components

b appropriate safety precautions:

i PPE

ii motorcycle protection when dismantling

iii removal and replacing engine mechanical and power train units and components

c the important of logical and systematic processes.

d the inspection and testing of engine mechanical and power train units and components.

e the preparation of replacement units for re-fitting or replacement.

f the reasons why replacement components and units must meet the original specifications (OES) – warranty requirements, to maintain performance and safety requirements.

g refitting procedures.

h the inspection and testing of units and system to ensure compliance with manufacturer's, legal and performance requirements.

i the inspection and re-instatement of the motorcycle following repair to ensure customer satisfaction;

i cleanliness of motorcycle

ii security of components and fittings

iii re-instatement of components and fittings

Construction and operation of motorcycle engine mechanical systems

a four stroke

b two stroke

Key engineering principles that are related to engine mechanical systems

a compression ratio's

b volumetric efficiency

c cylinder capacity

Common terms used in motorcycle engine mechanical system design

a tdc

b bdc

c stroke

d bore

e ports

Construction and operation of motorcycle engine lubrication components and systems

a full flow

b by pass

c wet sump

d dry sump

e total loss

Key engineering principles that are related to motorcycle engine lubrication systems

a classification of lubricants

b properties of lubricants

c methods of reducing friction

Common terms used in motorcycle engine lubrication system design

a identify motorcycle engine cooling system components

b air cooling

c liquid cooling

Key engineering principles that are related to motorcycle engine cooling systems

a heat transfer

b linear and cubical expansion

c specific heat capacity

d boiling point of liquids

Construction and operation of motorcycle clutch and transmission system components

a dry clutch

b wet clutch

c constant mesh

d CVT

e automatic

f chain and sprocket

g shaft and gear

h belt and pulley

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand how the main motorcycle engine mechanical systems operate	1.1	identify motorcycle engine mechanical system components			
		1.2	describe the construction and operation of motorcycle engine mechanical systems			
		1.3	compare key engine mechanical system components and assemblies against alternatives to identify differences in construction and operation			
		1.4	identify the key engineering principles that are related to engine mechanical systems a compression ratio's b cylinder capacity c power d torque			
		1.5	state common terms used in motorcycle engine mechanical system design a tdc b bdc c stroke d bore			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
2	Understand how motorcycle engine Lubrication systems operate	2.1	identify motorcycle engine lubrication system components			
		2.2	describe the construction and operation of motorcycle engine lubrication components and systems			
		2.3	compare key motorcycle engine lubrication system components and assemblies to identify differences in construction and operation			
		2.4	identify the key engineering principles that are related to motorcycle engine lubrication systems a classification of lubricants b properties of lubricants c methods of reducing friction			
		2.5	state common terms used in motorcycle engine lubrication system design			
3	Understand how motorcycle engine cooling systems operate	3.1	identify motorcycle engine cooling system components			
		3.2	describe the construction and operation of motorcycle engine cooling systems			
		3.3	compare key motorcycle engine cooling system components and assemblies against alternatives to identify differences in construction and operation			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		3.4	identify the key engineering principles that are related to motorcycle engine cooling systems a heat transfer b linear and cubical expansion c specific heat capacity d boiling point of liquids			
		3.5	state common terms used in key motorcycle engine cooling system design			
4	Understand how motorcycle clutch and transmission systems operate	4.1	identify motorcycle clutch and transmission system components			
		4.2	describe the construction and operation of motorcycle clutch and transmission system components			
		4.3	compare key motorcycle clutch and transmission system components and assemblies against alternatives to identify differences in construction and operation			
5	Understand how to check, replace and test power train systems, units and components	5.1	describe how to remove and replace power train systems, units and components			
		5.2	describe common types of testing methods used to check the operation of engine power train systems and their purpose			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		5.3	explain how to test and evaluate the performance of replacement units against motorcycle specification			
		5.4	explain common faults found in motorcycle power train systems and their causes			

Learner name: _____ Date:_____

Learner signature: _____ Date:_____

Assessor signature: _____ Date:_____

Internal verifier signature: _____ Date:_____
(*if sampled*)

Unit 11: Knowledge of Motorcycle Fuel, Ignition, Air and Exhaust System Units and Components

Unit reference number: T/601/5527

QCF level: 2

Credit value: 3

Guided learning hours: 20

Unit Summary

This unit enables the learner to develop an understanding of the construction and operation of common fuel, ignition, air and exhaust systems. It also covers the procedures involved in the removal and replacement of system components and the evaluation of their performance.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Knowledge Unit Syllabus as set out below:

Fuel — Petrol

a the function and layout of carburettor systems:
   i carburettor, single and multi-type
   ii fuel tank and control lever
   iii fuel pumps

b the operation of carburettor systems
   i carburettor, single and multi-type
   ii float chamber and designs
   iii vacuum and piston assembly
   iv needles and jets
   v adjustment for idle and mixture
   vi choke and enrichment devise
   vii fuel tank and control lever
   viii fuel pumps

c the function of petrol injection systems and components
   i petrol injection systems
   ii injection components
   iii injection pump
   iv pump relay
   v injector valve
   vi air flow sensor
   vii throttle potentiometer
   viii idle speed control valve
   ix coolant sensor
   x MAP and air temperature sensors
   xi mechanical control devices
   xii electronic control units
d the operation petrol injection systems and components:
   i injection pump
   ii pump relay
   iii injector valve
   iv air flow sensor
   v throttle potentiometer
   vi idle speed control valve
   vii coolant sensor
   viii MAP and air temperature sensors
   ix electronic control units
   x fuel pressure regulators
   xi fuel pump relays
   xii lambda exhaust sensors
   xiii flywheel and camshaft sensors
   xiv air flow sensors (air flow meter and air mass meter)
e the procedures used when inspecting petrol system
f the chemically correct air/fuel ratio for petrol engines
g weak and rich air/fuel ratios for petrol engines.
h exhaust composition and by-products for chemically correct, rich and weak air/fuel ratios of petrol engines:
   i water vapour (H2O)
   ii nitrogen (N)
   iii carbon monoxide (CO)

iv carbon dioxide (CO2)

v carbon (C)

vi hydrocarbon (HC)

vii oxides of nitrogen (NOx, NO2, NO) and particulates

i symptoms and faults associated with fuel systems

i erratic running

ii weak mixture

iii rich mixture

iv two stroke mixtures

v excessive smoke

vi leaks

vii failure to start

viii poor economy

ix failure to meet emission control

Ignition

a the layout of ignition systems

b ignition circuits and components:

i LT Circuit

ii battery

iii ignition switch

iv electronic trigger devices

v HT Circuit

vi spark plugs (reach, heat range, electrode features

vii ignition leads

viii ignition coil

ix ignition timing advance system

c the operation electronic system components:

i amplifiers

ii triggering systems

iii inductive pick-ups

iv amplifier units.

v control units

d ignition terminology:

i dwell angle

ii dwell time

iii advance and retard of ignition timing

iv static and dynamic ignition timing

e the operation of electronic ignition systems under various conditions and loads to include:

i engine idling

ii during acceleration

iii under full load

iv cruising

v overrun

vi cold starting

f basic principle of engine management systems:

i closed loop system

ii integrated ignition

iii injection systems

iv sensors

g the procedures used when inspecting

i ignition system

ii engine management

iii sensors

h symptoms and faults associated with ignition system operation

i failure to start hot or cold

ii exhaust emissions

iii poor performance

iv ignition noise

v misfire

vi damp

Air supply and exhaust systems

a the construction and purpose of air filtration systems

b the operating principles of air filtration systems

c the construction and purpose of the exhaust systems

d the operating principles of the systems

e exhaust system design to include silencers and catalytic converters

f the procedures used when inspecting induction, air filtration and exhaust systems

g symptoms and faults associated with air and exhaust systems

General

a the preparation, testing and use of tools and equipment used for:
   i dismantling
   ii removal and replacement of engine units and components

b appropriate safety precautions:
   i PPE
   ii motorcycle protection when dismantling
   iii removal and replacing engine units and components

c the important of logical and systematic processes.

d the inspection and testing of engine units and components.

e the preparation of replacement units for re-fitting or replacement.

f the reasons why replacement components and units must meet the original specifications (OES) – warranty requirements, to maintain performance and safety requirements.

g refitting procedures.

h the inspection and testing of units and system to ensure compliance with manufacturer's, legal and performance requirements.

i the inspection and re-instatement of the motorcycle following repair to ensure customer satisfaction;
   i cleanliness of motorcycle interior and exterior
   ii security of components and fittings
   iii re-instatement of components and fittings

Construction and operation of motorcycle engine fuel systems

a carburettor

b multi point injection

Key engineering principles that are related to motorcycle engine fuel systems

a properties of fuels

b combustion processes

c exhaust gas constituents

Key engineering principles that are related to motorcycle engine ignition systems

a flame travel

b ignition timing

c voltages

Construction and operation of motorcycle engine air supply and exhaust systems

a manifolds

b filters

c silencers, including two stroke

d catalytic converter

Key engineering principles that are related to motorcycle engine air supply and exhaust systems

a sound absorption

b reduction of harmful emissions

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand how motorcycle engine fuel systems operate	1.1	identify motorcycle engine fuel system components			
		1.2	describe the construction and operation of motorcycle engine fuel systems			
		1.3	compare key motorcycle engine fuel system components and assemblies against alternatives to identify differences in construction and operation			
		1.4	identify the key engineering principles that are related to motorcycle engine fuel systems a properties of fuels b combustion processes c exhaust gas constituents			
		1.5	state common terms used in motorcycle engine fuel system design			
2	Understand how motorcycle engine ignition systems operate	2.1	identify motorcycle engine ignition system components			
		2.2	describe the construction and operation of fundamental motorcycle engine ignition systems			
		2.3	compare key motorcycle engine ignition system components and assemblies against alternatives to identify differences in construction and operation			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		2.4	identify the key engineering principles that are related to motorcycle engine ignition systems a flame travel b ignition timing			
		2.5	state common terms used in key motorcycle engine ignition system design			
3	Understand how motorcycle engine air supply and exhaust systems operate	3.1	identify motorcycle engine air supply and exhaust system components			
		3.2	describe the construction and operation of motorcycle engine air supply and exhaust systems			
		3.3	compare key motorcycle air supply and exhaust system components and assemblies against alternatives to identify differences in construction and operation			
		3.4	identify the key engineering principles that are related to motorcycle engine air supply and exhaust systems a sound absorption b reduction of harmful emissions			
		3.5	state common terms used in key motorcycle engine air supply and exhaust system design			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Understand how to check, replace and test fuel, ignition, air and exhaust systems, units and components	4.1	describe how to remove and replace fuel, ignition, air and exhaust systems, units and components			
		4.2	describe common types of testing methods used to check the operation of fuel, ignition, air and exhaust systems and their purpose			
		4.3	explain how to test and evaluate the performance of replacement units against motorcycle specification			
		4.4	explain common faults found in motorcycle fuel, ignition, air and exhaust systems, units and components and their causes			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 12: Skills in Removing and Replacing Motorcycle Electrical Units and Components

Unit reference number: D/601/5604

QCF level: 2

Credit value: 5

Guided learning hours: 45

Unit Summary

This unit allows the learner to develop skills to remove and replace motorcycle electrical system components. It also covers the evaluation of performance of the replaced units and systems.

Assessment Requirements/Evidence requirements:

This unit must adhere to the IMI Skills Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre

3 be observed by an assessor as defined by the IMI Assessment Strategy

4 be observed by your assessor successfully carrying out the removal and replacement of Vehicle Electrical Units and Components from **3 different systems out of the 5 listed below:**

- a lighting
- b security and alarm
- c information and entertainment
- d telephone and two-way communication
- e monitoring and instrumentation systems

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work safely when carrying out removal and replacement activities	1.1	use suitable personal protective equipment and motorcycle coverings throughout all light motorcycle routine maintenance activities			
		1.2	work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment			
2	Be able to use relevant information to carry out the task	2.1	select suitable sources of technical information to support motorcycle electrical unit and component removal and replacement activities including: a motorcycle technical data and codes b removal and replacement procedures c legal requirements			
		2.2	use technical information to support motorcycle electrical unit and component removal and replacement activities			
3	Be able to use appropriate tools and equipment	3.1	select the appropriate tools and equipment necessary for removal and replacement of motorcycle electrical system components			
		3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements			
		3.3	use the correct tools and equipment in the way specified by manufacturers to remove and replace motorcycle electrical systems			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to carry out removal and replacement of motorcycle electrical units and components.	4.1	remove and replace the motorcycle electrical systems and components, adhering to the correct specifications and tolerances for the motorcycle and following: a the manufacturer's approved and workplace removal and replacement methods b recognised researched repair methods c health and safety requirements			
		4.2	ensure that replaced motorcycle electrical units and components conform to the motorcycle operating specification and any legal requirements			
		4.3	use suitable testing methods to evaluate the performance of the reassembled system			
		4.4	ensure that the reassembled motorcycle electrical systems performs to the motorcycle operating specification and meets any legal requirements			
5	Be able to record information and make suitable recommendations	5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required			
		5.2	make suitable and justifiable recommendations for cost effective repairs			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		5.3	record and report any additional faults noticed during the course of their work promptly in the format required			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 13: Knowledge of Removing and Replacing Motorcycle Electrical Units and Components

Unit reference number: H/601/5555

QCF level: 2

Credit value: 6

Guided learning hours: 45

Unit Summary

This unit enables the learner to develop an understanding of the principles, construction and operation and testing methods of common electrical and electronic systems and components. It also covers the procedures involved in the removal and replacement of system components and the evaluation of their performance.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Knowledge Unit Syllabus as set out below:

Electrical / Electronic Principles

a electrical units:
- i volt (electrical pressure)
- ii ampere (electrical current)
- iii ohm (electrical resistance)
- iv watt (power)

b the requirements for an electrical circuit:
- i battery
- ii cables
- iii switch
- iv current consuming device
- v continuity

c the direction of current flow and electron flow.

d series and parallel circuits to include:
- i current flow
- ii voltage of components

iii volt drop

iv resistance

v the effect on circuit operation of open circuit component(s)

e earth and insulated return systems

f cable sizes and colour codes

g different types of connectors, terminals and circuit protection devices

h common electrical and electronic symbols

i the meaning of:

i short circuit

ii open circuit

iii bad earth

iv high resistance

v electrical capacity

j the principles of motorcycle electronic systems and component.

k interpret motorcycle wiring diagrams to include:

i motorcycle lighting

ii auxiliary circuits

iii indicators

iv starting and charging systems

l function and construction of electrical components including:

i circuit relays

ii bulb types

iii cooling fan

iv circuit protection

m the safety precautions when working on electrical and electronic systems to include:

i disconnection and connection of battery

ii avoidance of short circuits

iii power surges

iv prevention of electric shock

v protection of electrical and electronic components

vi protection of circuits from overload or damage

n the set-up and use of:

i digital and analogue multi-meters

ii voltmeter

iii ammeter

iv ohmmeter

v oscilloscope

vi manufacturer's dedicated test equipment

o electrical and electronic checks for electrical and electronic systems to include:

i connections

ii security

iii functionality

iv performance to specifications

v continuity, open circuit

vi short circuit

vii high resistance

viii volt drop

ix current consumption

x output patterns (oscilloscope)

p symptoms and faults associated with electrical and electronic systems to include:

i high resistance

ii loose and corroded connections

iii short circuit

iv excessive current consumption

v open circuit

vi malfunction

vii poor performance

viii battery faults to include flat battery

ix failure to hold charge

x low state of charge

xi overheating

xii poor starting

Battery and Charging

The construction and operation of motorcycle batteries including:

a low maintenance and maintenance free

b lead acid and nickel cadmium types

c cells

d separators

e plates

f electrolyte

The operation of the motorcycle charging system:

a alternator

b rotor

c stator

d slip ring

e brush assembly

f three phase output

g diode rectification pack

h voltage regulation

i phased winding connections

j cooling fan

k alternator drive

Starting

a the layout, construction and operation of engine starting systems

b the function and operation of the following components:

- i starter motor
- ii starter clutch mechanism
- iii pinion
- iv starter solenoid
- v clutch and gear safety switch
- vi ignition/starter switch
- vii stand switches
- viii starter relay (if appropriate)

Lighting

a function and construction of electrical components including:

- i front and tail lamps
- ii main and dip beam headlamps
- iii lighting and dip switch
- iv directional indicators
- v flash

b the circuit diagram and operation of components for:

- i side and tail lamps
- ii headlamps
- iii direction indicators

c the statutory requirements for motorcycle lighting when using a motorcycle on the road

d headlamp adjustment and beam setting

Auxiliary Systems

a function and construction of electrical components including:

  i anti theft devises

  ii horn

  iii heated grips

  iv power screen

b the circuit diagram and operation of components for:

  i anti theft devises

  ii horn

  iii heated grips

  iv power screen

General

a the preparation, testing and use of:

  i tools and equipment

  ii electrical meters and equipment used for dismantling

  iii removal and replacement of electrical and electronic systems and components

b appropriate safety precautions:

  i PPE

  ii motorcycle protection when dismantling

  iii removal and replacing electrical and electronic components and systems

c the important of logical and systematic processes

d preparation of replacement units for re-fitting or replacement electrical and electronic components and systems

e the reasons why replacement components and units must meet the original specifications (OES) – warranty requirements, to maintain performance, safety requirements

f refitting procedures

g the inspection and testing of units and systems to ensure compliance with manufacturer's, legal and performance requirements

h inspection and re-instatement of the motorcycle following repair to ensure:

i customer satisfaction

ii cleanliness of motorcycle interior and exterior

iii security of components and fittings

iv re-instatement of components and fittings

Construction and operation of motorcycle auxiliary systems
Auxiliary systems to include:

a lighting systems

b security and alarm systems

c comfort and convenience systems

d information system

e communication systems

f monitoring and instrumentation systems

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand motorcycle electrical and electronic principles	1.1	identify electrical symbols and units found in motorcycle circuits			
		1.2	describe how to interpret motorcycle wiring diagrams			
		1.3	describe the operation of key motorcycle circuit safety protection devices and why these are necessary			
		1.4	describe motorcycle earthing principles and earthing methods			
		1.5	identify the use of different cables and connectors used in motorcycle circuits			
		1.6	describe the operation of electrical and electronic sensors and actuators and their application			
		1.7	describe the key electrical and electronic control principles that are related to motorcycle electrical circuits			
		1.8	state common terms used in motorcycle electrical circuits			
2	Understand how motorcycle batteries, starting and charging systems operate	2.1	identify motorcycle batteries, starting and charging system components			
		2.2	describe the construction and operation of motorcycle batteries, starting and charging system components			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		2.3	compare motorcycle batteries, starting and charging system components and assemblies against alternatives to identify differences in construction and operation			
		2.4	state common terms used in conjunction with motorcycle batteries, starting and charging systems			
3	Understand how motorcycle auxiliary electrical systems operate	3.1	identify motorcycle auxiliary system components			
		3.2	describe the construction and operation of motorcycle auxiliary systems			
		3.3	compare key motorcycle auxiliary system components and assemblies against alternatives to identify differences in construction and operation			
		3.4	state common terms used in motorcycle auxiliary system design			
4	Understand how to check, replace and test electrical and electronic systems, units and components	4.1	describe how to remove and electrical and electronic systems, units and components			
		4.2	describe common types of testing methods used to check the operation of electrical and electronic systems and their purpose			
		4.3	explain how to test and evaluate the performance of replacement units against motorcycle specification			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		4.4	identify common faults found in motorcycle electrical and electronic systems and their causes			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 14: Skills in Removing and Replacing Motorcycle Chassis Units and Components

Unit reference number: M/601/5610

QCF level: 2

Credit value: 5

Guided learning hours: 45

Unit Summary

This unit allows the learner to develop skills to remove and replace motorcycle steering, suspension and braking units (including wheels and tyres). It also covers the evaluation of performance of the replaced units and systems.

Assessment Requirements/Evidence requirements:

This unit must adhere to the IMI Skills Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre

3 be observed by an assessor as defined by the IMI Assessment Strategy

4 be observed by your assessor successfully carrying out the removal and replacement of **3 different units or components** – one from each system. Your evidence must include demonstration of skill **in each** aspect of mechanical and hydraulic/fluid units or component removal and replacement.

- steering
- suspension
- braking

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work safely when carrying out removal and replacement activities	1.1	use suitable personal protective equipment and motorcycle coverings throughout all motorcycle routine maintenance activities			
		1.2	work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment			
2	Be able to use relevant information to carry out the task	2.1	select suitable sources of technical information to support motorcycle chassis unit and component removal and replacement activities including: a motorcycle technical data b removal and replacement procedures c legal requirements			
		2.2	use technical information to support motorcycle chassis unit and component removal and replacement activities			
3	Be able to use appropriate tools and equipment	3.1	select the appropriate tools and equipment necessary for removal and replacement of motorcycle chassis systems including: a steering b suspension c braking d wheels & tyres			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements			
		3.3	use the correct tools and equipment in the way specified by manufacturers to remove and replace motorcycle chassis systems			
4	Be able to carry out removal and	4.1	remove and replace the motorcycle chassis systems and components, adhering to the correct specifications and tolerances for the motorcycle and following: a the manufacturer's approved removal and replacement methods b recognised researched repair methods c health and safety requirements			
		4.2	ensure that replaced motorcycle chassis units and components conform to the motorcycle operating specification and any legal requirements			
		4.3	use suitable testing methods to evaluate the performance of the reassembled system			
		4.4	ensure that the reassembled motorcycle chassis system performs to the vehicle operating specification and meets any legal requirements			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
5	Be able to record information and make suitable recommendations	5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required			
		5.2	make suitable and justifiable recommendations for cost effective repairs			
		5.3	record and report any additional faults noticed during the course of their work promptly in the format required			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 15: Knowledge of Removing and Replacing Motorcycle Chassis Units and Components

Unit reference number: T/601/5558

QCF level: 2

Credit value: 6

Guided learning hours: 45

Unit Summary

This unit enables the learner to develop an understanding of the construction and operation of common steering, suspension and braking systems (including wheels and tyres). It also covers the procedures involved in the removal and replacement of system components and the evaluation of their performance.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Knowledge Unit Syllabus as set out below:

Steering

a the action and purpose of steering geometry:
   i castor angle
   ii trail angle
   iii wheel alignment

b the following terms associated with steering:
   i castor angle
   ii trail angle
   iii rake angle
   iv wheel alignment

c the components and layout of steering systems:
   i handlebar
   ii conventional steering head
   iii leading link
   iv bearings
   v steering stem
   vi yolk

d the procedures used for inspecting the serviceability and condition of:
   i conventional steering head
   ii leading link
e steering system defects to include:
   i uneven tyre wear
   ii steering vibrations
   ii wear in linkage
   iii bearing failure
   iv damage linkage
   v excessive play
   vi incorrect fork alignment
   vii incorrect steering geometry

Suspension

a the layout and components of suspension systems:
   i conventional telescopic fork and tube
   ii upside down telescopic fork and tube
   iii hossack/Fior (Duolever) fork
   iv springer fork
   v leading link
b the operation of suspension systems and components:
   i convention telescopic fork and tube
   ii upside down telescopic fork and tube
   iii hydraulic damper
   iv double swinging arm
   v single swing arm
   vi mono shock
   vii adjustable damper
   viii adjustable spring
c the advantages of different systems including:
   i convention telescopic fork and tube
   ii upside down telescopic fork and tube
   iii hydraulic damper
   iv double swinging arm
   v single swing arm
   vi mono shock

vii adjustable damper

viii adjustable spring

d the forces acting on suspension systems during braking, riding and cornering

e the methods of locating the road wheels against braking, driving and cornering forces

f suspension terms:

i rebound

ii bump

iii dive

g the procedures used for inspecting the serviceability and condition of the suspension system

h suspension system defects:

i wheel hop

ii ride height

iii wear

iv noises under operation

v fluid leakage

vi excessive travel

vii excessive tyre wear

viii poor handling

ix worn dampers

x worn joints

xi damaged linkages

Brakes

a the construction and operation of drum brakes:

i leading and trailing shoe construction

ii drum designs

iii cable

iv hydraulic

v self-servo action

vi adjustment

b the construction and operation of disc brakes:

i disc pads

ii calliper

iii brake disc

iv ventilated disc

v disc pad retraction

c the construction and operation of the hydraulic braking system:

i master cylinders

ii disc brake calliper & pistons

iii brake pipe

iv warning lights

d the principles and components of electronic ABS systems, electrical and electronic components.

e the requirements and hazards of brake fluid:

i boiling point

ii hygroscopic action

iii manufacturer's change periods

iv fluid classification and rating

v potential to damage paint surfaces

f terms associated with mechanical and hydraulic braking systems:

i braking efficiency

ii brake fade

iii ABS

g the procedures used for inspecting the serviceability and condition of the braking system

h braking system defects:

i worn brake shoes or pads

ii worn or scored brake drums

iii worn or scored brake discs

iv abnormal brake noises

v brake judder

vi brake adjustments

vii fluid contamination of brake surfaces

viii antilock brake failure

ix fluid leaks

x poor braking efficiency

xi brake bind

xii brake grab

xiii brake fade

Wheel and Tyres

a the construction of different types of tyre:
   i radial
   ii tread patterns
   iii tyre mixing regulations
   iv tyre applications

b tyre markings:
   i tyre and wheel size markings
   ii speed rating
   iii direction of rotation
   iv profile
   v tread-wear indicators

c wheel construction:
   i light alloy
   ii wire wheels
   iii bearing arrangement
   iv roller ball
   v taper

d the procedures used for inspecting the serviceability and condition of:
   i tyres and wheels
   ii bearings

e the defects associated with tyres and wheels:
   i abnormal tyre wear
   ii cuts
   iii side wall damage
   iv wheel vibrations

General

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

a the preparation:
   i testing and use of tools and equipment
   ii electrical meters and equipment used for dismantling

b appropriate safety precautions:
   i PPE
   ii vehicle protection when dismantling
   iii removing and replacing chassis motorcycle chassis units, parts and system components

c the important of logical and systematic processes

d the inspection and testing systems and components

e the preparation of replacement units for re-fitting or replacement of motorcycle chassis units, parts and system components Identify the reasons why replacement components and units must meet the original specifications (OES):

  i warranty requirements

  ii to maintain performance

  iii safety requirements

f refitting procedures

g the inspection and testing of units and systems to ensure compliance with manufacturer's, legal and performance requirements

h the inspection and re-instatement of the vehicle following repair to ensure customer satisfaction:

  i cleanliness of motorcycle

  ii security of components and fittings

  iii re-instatement of components and fittings

Construction and operation of motorcycle steering and suspension systems

a conventional steering head

b leading link

c swinging arm

d single swing arm

Key engineering principles that are related to motorcycle steering and suspension systems

a steering geometry

b steering angles

c hydraulic damping

d stress and strain

Key engineering principles that are related to motorcycle steering and suspension systems

a steering geometry

b steering angles

c hydraulic damping

d stress and strain

Construction and operation of motorcycle braking systems

a cable

b hydraulic braking

c electronic ABS system

Key engineering principles that are related to motorcycle braking systems

a laws of friction

b hydraulics

c properties of fluids

d braking efficiency

Construction and operation of motorcycle wheels and tyres

a tyre construction

b tyre markings

c wheel construction

Key engineering principles that are related to motorcycle wheel and tyre systems

a friction

b un-sprung weight

c dynamic and static balance

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand how motorcycle steering and suspension systems operate	1.1	identify motorcycle and suspension system components			
		1.2	describe the construction and operation of motorcycle steering and suspension systems			
		1.3	compare key motorcycle steering and suspension system components and assemblies against alternatives to identify differences in construction and operation			
		1.4	identify the key engineering principles that are related to motorcycle steering and suspension systems a steering angles b hydraulic forces c stress and strain			
		1.5	state common terms used in motorcycle steering and suspension system design			
2	Understand how motorcycle braking systems operate	2.1	identify motorcycle braking system components			
		2.2	describe the construction and operation of motorcycle braking systems			
		2.3	compare key motorcycle braking system components and assemblies against alternatives to identify differences in construction and operation			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		2.4	identify the key engineering principles that are related to motorcycle braking systems a laws of friction b hydraulics c properties of fluids d properties of air e braking efficiency			
		2.5	state common terms used in motorcycle braking system design			
3	Understand how motorcycle wheel and tyres systems operate	3.1	identify motorcycle wheel and tyre components			
		3.2	describe the construction and operation of motorcycle wheels and tyres			
		3.3	compare key motorcycle wheel and tyre components and assemblies against alternatives to identify differences in construction and operation			
		3.4	identify the key engineering principles that are related to motorcycle wheel and tyre systems a friction b un-sprung weight c dynamic and static balance			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		3.5	state common terms used in motorcycle wheel and tyre design			
4	Understand how to check, replace and test chassis units, parts, and components	4.1	describe how to remove and replace chassis units and components			
		4.2	describe common types of testing methods used to check the operation of chassis units and components and their purpose			
		4.3	explain how to test and evaluate the performance of replacement units against vehicle specification			
		4.4	identify common faults found in motorcycle chassis units and components			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 16: Skills to Identify and Agree Motor Vehicle Customer Service Needs

Unit reference number: M/601/6286

QCF level: 3

Credit value: 5

Guided learning hours: 40

Unit Summary

This unit helps the learner to develop the skills required to: gain information from customers on their perceived needs; give advice and information and agree a course of action; contract for the agreed work and complete all necessary records and instructions.

Assessment Requirements/Evidence requirements:

This unit must adhere to the IMI Skills Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre

3 be observed by an assessor as defined by the IMI Assessment Strategy

4 produce evidence, including records, to show that you have dealt with **3 different customers**

5 be observed by your assessor on at least **1** occasion

Evidence from real activity **or role-play is acceptable** for this unit.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to obtain relevant information from the customer	1.1	obtain and interpret sufficient, relevant information, from the customer to make an assessment of their needs			
		1.2	clarify customer and vehicle needs by referring to vehicle data and operating procedures			
2	Be able to provide relevant information to the customer	2.1	provide customers with accurate, current and relevant advice and information, in a form that the customer will understand			
		2.2	demonstrate techniques which encourage customers to ask questions and seek clarification during conversation			
3	Be able to agree work undertaken with the customer	3.1	summarise and record work agreed with the customer, before accepting the vehicle			
		3.2	implement confirmation of the agreement by ensuring customer understanding			
4	Be able to ensure recording systems are implemented correctly	4.1	use recording systems which are accurate and complete, in the required format and signed by the customer where necessary			
		4.2	perform the next stage in the process by passing on completed records to the correct person promptly			
		4.3	demonstrate correct procedures for customer approval where the contracted agreement is likely to be exceeded			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 17: Knowledge of how to Identify and Agree Motor Vehicle Customer Service Needs

Unit reference number: R/601/6247

QCF level: 3

Credit value: 5

Guided learning hours: 45

Unit Summary

This unit enables the learner to develop an understanding of how to gain: information from customers on their perceived needs; give advice and information and agree a course of action; contract for the agreed work and complete all necessary records and instructions.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy (*Annexe C*) and adhere to the IMI Knowledge Unit Syllabus as set out below:

Organisational Requirements

a explain the organisation's terms and conditions applicable to the acceptance of customer vehicles

b explain the content and limitations of vehicle and component warranties for the vehicles dealt with by your organisation

c detail what, if any, limits there are to the authority for accepting vehicles

d detail why it is important to keep customers advised of progress and how this is achieved within the organisation

e detail the organisation's procedures for the completion and processing of documentation and records, including payment methods and obtaining customer signatures as applicable

Principles of Customer Communication and Care

a first impressions

b listening skills – 80:20 ratio

c eye contact and smiling

d showing interest and concern

e questioning techniques and customer qualification

f giving clear non-technical explanations

g confirming understanding (statement/question technique, reflective summary)

h written communication – purpose, content, presentation and style

i providing a high quality service – fulfilling (ideally exceeding) customer expectations within agreed time frames

j obtaining customer feedback and corrective actions when dissatisfaction expressed

k dealing with complaints

Company Products and Services

a service standards

- i national
- ii manufacturer
- iii organisational

b the range and type of services offered by the organisation

- i diagnostic
- ii servicing
- iii repair
- iv warranty
- v MOT testing
- vi fitment of accessories/enhancements
- vii internal

c the courses of action available to resolve customer problems

- i the extent and nature of the work to be undertaken
- ii the terms and conditions of acceptance
- iii the cost
- iv the timescale
- v required payment methods

d the effect of resource availability upon the receipt of customer vehicles and the completion of work

- i levels and availability of equipment
- ii levels and availability of technicians
- iii workshop loading systems

e how to access costing and work completion time information

- i manuals
- ii computer based

Vehicle Information Systems, Servicing and Repair Requirements

a accessing technical data including diagnostics

b servicing to manufacturer requirements/standards

c repair/operating procedures

d MOT standards/requirements

e quality controls – interim and final

f requirements for cleanliness of vehicle on return to customer

g handover procedures

Consumer Legislation. To include:

a consumer protection

b sale of goods

c data protection

d product liability

e health and safety

f discrimination

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand legislative and organisational requirements and procedures	1.1	describe the fundamental legal requirements of current consumer legislation and the consequences of their own actions in respect of this legislation			
		1.2	describe the content and limitations of company and product warranties for the vehicles dealt with by their company			
		1.3	explain the limits of their own authority for accepting vehicles			
		1.4	explain the importance of keeping customers informed of progress			
		1.5	describe their workplace requirements for the completion of records			
		1.6	explain how to complete and process all the necessary documentation			
2	Understand how to communicate and care for customers	2.1	explain how to communicate effectively with customers			
		2.2	describe how to adapt your language when explaining technical matters to non-technical customers			
		2.3	explain how to use effective questioning techniques			
		2.4	describe how to care for customers and achieve customer satisfaction			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
3	Understand company products and services	3.1	describe the range of options available to resolve vehicle problems			
		3.2	describe the range and type of services offered by their company			
		3.3	explain the effect of resource availability upon the receipt of customer vehicles and the completion work			
		3.4	explain how to access costing and work completion time information			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 18: Knowledge of Motorcycle Preparation and Inspection

Unit reference number: F/601/5563

QCF level: 2

Credit value: 2

Guided learning hours: 20

Unit Summary

This unit enables the learner to develop knowledge in order to carry out preparation activities and inspections of both new and used motorcycles.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy (*Annexe C*) and adhere to the IMI Knowledge Unit Syllabus as set out below:

Pre and post work motorcycle inspections and record findings

a PPE and motorcycle protection relating to:
   i motorcycle body panels and frame
   ii paint surfaces
   iii polished surfaces
   iv seats

b pre and post work motorcycle inspection procedures:
   i aural
   ii visual and functional assessments on engine
   iii engine systems
   iv ivchassis systems
   v wheels and tyres
   vi transmission system
   vii electrical and electronic systems
   viii exterior motorcycle body panels and frame

c the methods for carrying out inspections for: damage, corrosion, fluid leaks, wear, security, mounting security and condition to include:
   i engines and engine systems
   ii chassis systems

iii transmission systems
iv brakes
v steering
vi suspension
vii wheels
viii tyres
ix body panels and frame
x electrical and electronic systems and components
xi motorcycle seating and mirrors
xii motorcycle instrumentation
xiii driver controls

d check conformity to manufacturer's specifications and legal requirements

e Completion of documentation to include:
i inspection records
ii job cards
iii motorcycle records

f make recommendations based on results of motorcycle inspections

g the checks necessary to ensure customer satisfaction for:
i motorcycle body panels
ii paint surfaces
iii polished surfaces
iv chromed surfaces
v seats and mirrors

h prepare and use appropriate inspection equipment and tools

i inspection procedures following inspection checklists

Various motorcycle preparation activities and inspections to include:

a new motorcycle assembly

b pre and post work

c pre-delivery on new and used motorcycles

d MOT test

e safety

f post repair

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand how to carry out preparation activities and inspections of motorcycles	1.1	explain the difference between the various motorcycle preparation activities and inspections			
		1.2	identify the different systems to be inspected when using inspection methods			
		1.3	identify the procedures involved in carrying out the preparation and inspection of motorcycles			
		1.4	identify correct conformity of motorcycle systems and condition on motorcycle inspections			
		1.5	compare test and inspection results against motorcycle specifications and legal requirements			
		1.6	explain how to record and complete the preparation and inspection results in the format required			
		1.7	identify the recommendations that can be made based on results of the motorcycle inspections			
		1.8	explain the implications of failing to carry out motorcycle preparation and inspection activities correctly			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		1.9	explain the implications of signing workplace documentation and motorcycle records			
		1.10	explain the procedure for reporting cosmetic damage to motorcycle components and units outside normal inspection items			

Learner name: _____ Date:_____

Learner signature: _____ Date:_____

Assessor signature: _____ Date:_____

Internal verifier signature: _____ Date:_____
(*if sampled*)

Unit 19: Skills in Motorcycle Preparation and Inspection

Unit reference number: Y/601/5617

QCF level: 2

Credit value: 2

Guided learning hours: 20

Unit Summary

This unit enables the learner to develop skills in order to carry out Preparation Activities and Inspections on both old and new Motorcycle. In accordance of Manufacturers and Legal requirements.

Assessment Requirements/Evidence requirements:

This unit must adhere to the IMI Skills Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre

3 be observed by an assessor as defined by the IMI Assessment Strategy

4 be observed by your assessor successfully carrying out **at least 1** different inspection from the following:

- pre-work inspection
- post-work inspection
- pre-delivery inspection
- pre-purchase inspection
- MOT test inspection
- safety inspection
- post repair inspection

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work safely when carrying out motorcycle preparation activities and inspections	1.1	use suitable personal protective equipment and use suitable motorcycle coverings throughout all light motorcycle inspection activities			
		1.2	work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment			
2	Be able to use relevant information to carry out preparation activities and inspections of motorcycles	2.1	select suitable sources of technical information to support motorcycle inspection activities including: a motorcycle technical data b inspection procedures c legal requirements			
		2.2	use technical information to support motorcycle inspection activities			
3	Be able to use appropriate tools and equipment to carry out preparation activities and inspections of motorcycles	3.1	select the appropriate tools and equipment necessary when carrying out preparation and inspections			
		3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements			
		3.3	use the correct tools and equipment in the way specified by manufacturers when carrying out a range of inspections on motorcycle systems			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to carry out the preparation activities and inspections of motorcycles	4.1	carry out motorcycle preparation and inspections using prescribed methods, adhering to the correct specifications and tolerances for the motorcycle			
		4.2	ensure that inspected motorcycle conforms to the motorcycle operating specification and any legal requirements			
		4.3	ensure any comparison of the motorcycle against specification accurately identifies any differences from the motorcycle specification			
		4.4	use suitable testing methods to evaluate the performance of the inspected systems			
5	Be able to record information and make suitable recommendations	5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required			
		5.2	make suitable and justifiable recommendations for cost effective repairs			
		5.3	record and report any additional faults noticed during the course of their work promptly in the format required			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 20: Competency in Health, Safety and Good Housekeeping in the Automotive Environment

Unit reference number: A/601/6338

QCF level: 2

Credit value: 7

Guided learning hours: 60

Unit Summary

This unit will enable the learner to develop competency in order to:

- carry out day to day work area cleaning, clearing away, dealing with spillages and disposal of waste, used materials and debris
- identify hazards and risks in the automotive environment and complying with relevant legislation and good practice
- work safely at all times within the automotive environment, both as an individual and with others.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Competence Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or as defined within the IMI VCQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk

3 be observed by an assessor as defined in the IMI VCQ Assessment Strategy

4 produce evidence of use of personal and vehicle protection, cleaning the work environment and disposal of waste on **3** separate **occasions**

5 be observed by your assessor on at least **1** occasion carrying out the above

6 produce evidence of identifying risks which may result from at least **2** of the items listed below:

- the use and maintenance of machinery or equipment
- the use of materials or substances
- working practices which do not conform to laid down policies
- unsafe behaviour
- accidental breakages and spillages
- environmental factors

7 be observed by your assessor on at least **1** occasion carrying out the above

8 produce evidence of following at least **4** of the workplace policies listed below:

- the use of safe working methods and equipment
- the safe use of hazardous substances
- smoking, eating, drinking and drugs
- what to do in the event of an emergency
- personal presentation

9 be observed by your assessor following workplace policies on at least **1** occasion

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to use correct personal and vehicle protection within the automotive environment	1.1	select and use personal protective equipment throughout activities. To include appropriate protection of: a eyes b ears c head d skin e feet f hands g lungs			
		1.2	select and use vehicle protective equipment throughout all activities.			
2	Be able to carry out effective housekeeping practices in the automotive environment	2.1	select and use cleaning equipment which is of the right type and suitable for the task			
		2.2	use utilities and appropriate consumables, avoiding waste			
		2.3	use materials and equipment to carry out cleaning and maintenance duties in allocated work areas, following automotive work environment policies, schedules and manufacturers instructions			
		2.4	perform housekeeping activities safely and in a way which minimizes inconvenience to customers and staff			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		2.5	keep the work area clean and free from debris and waste materials			
		2.6	keep tools and equipment fit for purpose by regular cleaning and keeping tidy			
		2.7	dispose of used cleaning agents, waste materials and debris to comply with legal and workplace requirements			
3	Be able to recognise and deal with dangers in order to work safely within the automotive workplace	3.1	name and locate the responsible persons for health and safety in their relevant workplace			
		3.2	identify and report working practices and hazards which could be harmful to themselves or others			
		3.3	carry out safe working practices whilst working with equipment, materials and products in the automotive environment			
		3.4	rectify health and safety risks encountered at work, within the scope and capability of their job role			
4	Be able to conduct themselves responsibly	4.1	show personal conduct in the workplace which does not endanger the health and safety of themselves or others			
		4.2	display suitable personal presentation at work which ensures the health and safety of themselves and others at work			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 21: Competency in Supporting Job Roles in the Automotive Work Environment

Unit reference number: K/601/6366

QCF level: 3

Credit value: 5

Guided learning hours: 40

Unit Summary

This unit will help the learner develop competency in order to keep good working relationships with all colleagues and customers in the automotive work environment by using effective communication and support.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Competence Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or as defined within the IMI VCQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk

3 be observed by an assessor as defined in the IMI VCQ Assessment Strategy

4 produce evidence that you have worked well with others in the automotive industry

5 be observed by your assessor on at least **3** occasions carrying out the above whilst performing your normal work duties

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work effectively within the organisational structure of the automotive work environment	1.1	respond promptly and willingly to requests for assistance from customers and colleagues			
		1.2	refer customers and colleagues to the correct person should requests fall outside their responsibility and capability			
2	Be able to obtain and use information in order to support their job role within the automotive work environment	2.1	select and use legal and manufacturers information, in an automotive work environment			
3	Be able to communicate with and support colleagues and customers effectively within the automotive work environment	3.1	use methods of communication with customers and colleagues which meet their needs			
		3.2	give customers and colleagues accurate information			
		3.3	make requests for assistance from or to customers and colleagues clearly and courteously			
		3.4	report any anticipated delays in completion to the relevant persons promptly			
4	Be able to develop and keep good working relationships in the automotive work environment	4.1	contribute to team work by initiating ideas and co-operating with customers and colleagues			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		4.2	treat customers and colleagues in a way which shows respect for their views and opinions			
		4.3	make and keep achievable commitments to customers and colleagues			
		4.4	inform colleagues promptly of anything likely to affect their own work			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 22: Competency in Motorcycle Internal Engine Systems

Unit reference number: L/601/5484

QCF level: 2

Credit value: 10

Guided learning hours: 90

Unit Summary

This unit allows the learner to develop skills to remove and replace motorcycle engine power train mechanical, lubrication, cooling systems, clutch and transmission systems.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Competence Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or as defined within the IMI VCQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk

3 be observed by an assessor as defined in the IMI VCQ Assessment Strategy

4 produce evidence of removing and replacing units or components from **4** of the **6*** systems listed below. The evidence **must** come from work **in your normal workplace**

- cooling systems
- air supply and exhaust systems
- fuel and ignition systems
- lubrication systems (not including standard external filters)
- transmission systems
- clutch systems

5 be observed by your assessor on at least **1** occasion removing and replacing components or units

*However, you must prove to your assessor that you have the necessary knowledge and understanding to be able to perform competently in respect of **all** the systems listed above

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work safely when carrying out removal and replacement activities	1.1	use suitable personal protective equipment and motorcycle coverings throughout all light motorcycle routine maintenance activities			
		1.2	work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment			
2	Be able to use relevant information to carry out the task	2.1	select suitable sources of technical information to support motorcycle engine power train unit and component removal and replacement activities including: a motorcycle technical data b removal and replacement procedures c legal requirements			
		2.2	use technical information to support motorcycle engine power train unit and component removal and replacement activities			
3	Be able to use appropriate tools and equipment	3.1	select the appropriate tools and equipment necessary for removal and replacement of motorcycle engine power train systems			
		3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		3.3	use the correct tools and equipment in the way specified by manufacturers to remove and replace light motorcycle engine systems			
4	Be able to carry out removal and replacement of motorcycle electrical units and components	4.1	remove and replace the motorcycle electrical systems and components, adhering to the correct specifications and tolerances for the motorcycle and following: a the manufacturer's approved and workplace removal and replacement methods b recognised researched repair methods c health and safety requirements			
		4.2	check that replaced motorcycle electrical units and components conform to the motorcycle operating specification and any legal requirements			
		4.3	use suitable testing methods to evaluate the performance of the reassembled system			
		4.4	ensure that the reassembled motorcycle electrical systems performs to the motorcycle operating specification and meets any legal requirements			
		4.5	work to the specified timescale for the activity			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
5	Be able to record information and make suitable recommendations	5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required			
		5.2	make suitable and justifiable recommendations for cost effective repairs			
		5.3	identify and report any expected delays in completion to the relevant person(s) promptly in the format required.			
		5.4	record and report any additional faults noticed during the course of their work promptly in the format required			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 23: Competency in Removing and Replacing Motorcycle Electrical Units and Components

Unit reference number: K/601/5489

QCF level: 2

Credit value: 10

Guided learning hours: 90

Unit Summary

This unit allows the learner to develop skills to remove and replace motorcycle electrical system components. It also covers the evaluation of performance of the replaced units and systems.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Competence Unit Assessment Requirements as set out below:

General Requirements

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or as defined within the IMI VCQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk

3 be observed by an assessor as defined in the IMI VCQ Assessment Strategy

4 produce evidence of removing and replacing **at least 5** units or components, **each** from a **different** electrical system. At least **4** of these **5** pieces of evidence **must** come from work **in your normal workplace**

5 be observed by your assessor on **at least 1 occasion in your normal workplace** carrying out the removal and replacement of at least **1** of the following*:

- engine starting
- battery charging

6 be observed by your assessor on **at least 1 occasion in your normal workplace** successfully carrying out the removal and replacement of electrical units and components *:

- lighting
- security and alarm
- information and entertainment
- telephone and two-way communication
- monitoring and instrumentation systems

*However, you must prove to your assessor that you have the necessary knowledge and understanding to be able to perform competently in respect of **all** the systems listed above

Simulated activities **will be** acceptable to assess candidates' removal and replacement competence on no more than **1** occasion.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work safely when carrying out removal and replacement activities	1.1	use suitable personal protective equipment and motorcycle coverings throughout all light motorcycle routine maintenance activities			
		1.2	work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment			
2	Be able to use relevant information to carry out the task	2.1	select suitable sources of technical information to support motorcycle electrical unit and component removal and replacement activities including: a motorcycle technical data and codes b removal and replacement procedures c legal requirements			
		2.2	use technical information to support motorcycle electrical unit and component removal and replacement activities			
3	Be able to use appropriate tools and equipment	3.1	select the appropriate tools and equipment necessary for removal and replacement of motorcycle electrical system components			
		3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements			
		3.3	use the correct tools and equipment in the way specified by manufacturers to remove and replace motorcycle electrical systems			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to carry out removal and replacement of motorcycle electrical units and components	4.1	remove and replace the motorcycle electrical systems and components, adhering to the correct specifications and tolerances for the motorcycle and following: a the manufacturer's approved and workplace removal and replacement methods b recognised researched repair methods c health and safety requirements.			
		4.2	ensure that replaced motorcycle electrical units and components conform to the motorcycle operating specification and any legal requirements			
		4.3	use suitable testing methods to evaluate the performance of the reassembled system			
		4.4	ensure that the reassembled motorcycle electrical systems performs to the motorcycle operating specification and meets any legal requirements			
		4.5	work to the specified timescale for the activity			
5	Be able to record information and make suitable recommendations	5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format require			
		5.2	make suitable and justifiable recommendations for cost effective repairs			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		5.3	identify and report any expected delays in completion to the relevant person(s) promptly in the format required			
		5.4	record and report any additional auto electrical faults noticed during the course of their work promptly in the format required			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 24: Competency in Removing and Replacing Motorcycle Chassis Units and Components

Unit reference number: T/601/5494

QCF level: 2

Credit value: 10

Guided learning hours: 90

Unit Summary

This unit allows the learner to develop skills to remove and replace motorcycle steering, suspension and braking units (including wheels and tyres). It also covers the evaluation of performance of the replaced units and systems.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Competence Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet all of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or as defined within the IMI VCQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk

3 be observed by an assessor as defined in the IMI VCQ Assessment Strategy

4 produce evidence of removing and replacing **4 different units or components** in total which **must include items from** steering, suspension and braking systems. Your evidence must include demonstration of competence **in each** aspect of mechanical, electrical and hydraulic/fluid units or component removal and replacement

5 be observed in your normal workplace on at least **1 occasion** successfully removing and replacing units and components from one of the following systems:

- steering
- suspension
- braking

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work safely when carrying out removal and replacement activities	1.1	use suitable personal protective equipment and motorcycle coverings throughout all light motorcycle routine maintenance activities			
		1.2	work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment			
2	Be able to use relevant information to carry out the task	2.1	select suitable sources of technical information to support motorcycle chassis unit and component removal and replacement activities including: a motorcycle technical data b removal and replacement procedures c legal requirements			
		2.2	use technical information to support motorcycle chassis unit and component removal and replacement activities			
3	Be able to use appropriate tools and equipment	3.1	select the appropriate tools and equipment necessary for removal and replacement of motorcycle chassis systems including: a steering b suspension c braking d wheels & tyres			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements			
		3.3	use the correct tools and equipment in the way specified by manufacturers to remove and replace motorcycle chassis systems			
4	Be able to carry out removal and replacement of motorcycle chassis units and components	4.1	remove and replace the motorcycle chassis systems and components, adhering to the correct specifications and tolerances for the motorcycle and following: a the manufacturer's approved removal and replacement methods b recognised researched repair methods c health and safety requirements			
		4.2	ensure that replaced motorcycle chassis units and components conform to the motorcycle operating specification and any legal requirements			
		4.3	use suitable testing methods to evaluate the performance of the reassembled system			
		4.4	ensure that the reassembled motorcycle chassis system performs to the operating specification and meets any legal requirements			
		4.5	work to the specified timescale for the activity			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
5	Be able to record information and make suitable recommendations	5.1	produce work records that are accurate, completed and passed to the relevant person(s) promptly in the format required			
		5.2	make suitable and justifiable recommendations for cost effective repairs			
		5.3	identify and report any expected delays in completion to the relevant person(s) promptly in the format required			
		5.4	record and report any additional faults noticed during the course of their work promptly in the format required			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 25: Competency in Routine Motorcycle Maintenance

Unit reference number: D/601/5442

QCF level: 2

Credit value: 7

Guided learning hours: 60

Unit Summary

This unit allows the learner to develop skills they can carry out motorcycle routine maintenance, adjustments and replacement activities as part of the periodic servicing of motorcycles.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy (*Annexe C*) and adhere to the IMI Competence Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or as defined within the IMI VCQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk

3 be observed by an assessor as defined in the IMI VCQ Assessment Strategy

4 you must produce evidence of competently carrying out servicing activities on **at least 3 different vehicles** which collectively cover the Learning Outcomes

5 your assessor must physically observe you **in your normal workplace** carrying out a range of servicing activities on **at least 1 occasion**

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work safely when carrying out motorcycle routine maintenance	1.1	use suitable personal protective equipment and motorcycle coverings throughout all motorcycle routine maintenance activities			
		1.2	work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment			
2	Be able to use relevant information to carry out the task	2.1	select suitable sources of technical information to support motorcycle routine maintenance activities including: a motorcycle technical data b maintenance procedures c legal requirements			
		2.2	use technical information to support motorcycle inspection activities			
3	Be able to use appropriate tools and equipment	3.1	select the appropriate tools and equipment necessary for carrying out routine maintenance			
		3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements			
		3.3	use the correct tools and equipment in the way specified by manufacturers when carrying out routine maintenance			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to carry out motorcycle routine maintenance	4.1	carry out motorcycle inspections using prescribed methods, adhering to the correct specifications and tolerances for the motorcycle and following: a the manufacturer's approved inspection methods b recognised researched inspection methods c health and safety requirements			
		4.2	carry out adjustments, replacement of motorcycle components and replenishment of consumable materials following the manufacturer's current specification			
		4.3	ensure the examination methods identify accurately any motorcycle system and or component problems falling outside the maintenance schedule are specified			
		4.4	ensure that the inspected motorcycle conforms to the motorcycle operating specification and any legal requirements			
		4.5	use suitable testing methods to evaluate the performance of all replaced and adjusted components and systems accurately			
		4.6	work to the specified timescale for the activity			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
5	Be able to record information and make suitable recommendations	5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required			
		5.2	make suitable and justifiable recommendations for cost effective repairs			
		5.3	identify and report any expected delays in completion to the relevant person(s) promptly in the format required			
		5.4	record and report any additional faults noticed during the course of their work promptly in the format required			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 26: Competency in Identifying and Agreeing Motor Vehicle Customer Service Needs

Unit reference number: K/601/6383

QCF level: 3

Credit value: 5

Guided learning hours: 40

Unit Summary

This unit helps the learner to develop competency in order to: gain information from customers on their perceived needs; give advice and information and agree a course of action; contract for the agreed work and complete all necessary records and instructions.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Competence Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or as defined within the IMI VCQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk

3 be observed by an assessor as defined in the IMI VCQ Assessment Strategy

4 produce evidence, including records, to show that you have dealt with **3 different customers**

5 be observed by your assessor in your normal workplace dealing with **at least 1 customer**

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to obtain relevant information from the customer	1.1	obtain and interpret sufficient, relevant information, from the customer to make an assessment of their needs			
		1.2	clarify customer and vehicle needs by referring to vehicle data and operating procedures			
2	Be able to provide relevant information to the customer	2.1	provide customers with accurate, current and relevant advice and information, in a form that the customer will understand			
		2.2	demonstrate techniques which encourage customers to ask questions and seek clarification during conversation			
3	Be able to agree work undertaken with the customer	3.1	summarise and record work agreed with the customer, before accepting the vehicle			
		3.2	implement confirmation of the agreement by ensuring customer understanding			
4	Be able to ensure recording systems are implemented correctly	4.1	use recording systems which are accurate and complete, in the required format and signed by the customer where necessary			
		4.2	perform the next stage in the process by passing on completed records to the correct person promptly			
		4.3	demonstrate correct procedures for customer approval where the contracted agreement is likely to be exceeded			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 27: Competency in Motorcycle Preparation and Inspection

Unit reference number: J/601/5497

QCF level: 2

Credit value: 7

Guided learning hours: 60

Unit Summary

This unit enables the learner to develop skills in order to carry out Preparation Activities and Inspections on both old and new Motorcycle. In accordance of Manufacturers and Legal requirements.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Competence Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet all of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or as defined within the IMI VCQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk

3 be observed by an assessor as defined in the IMI VCQ Assessment Strategy

4 produce evidence of carrying out **at least 3** different inspections from the following**:**

- pre-work inspection
- post-work inspection
- pre-delivery inspection
- pre-purchase inspection
- MOT test inspection
- safety inspection
- post repair inspection

5 be observed by your assessor **in your normal workplace** successfully carrying out an inspection on **at least 1 occasion**

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work safely when carrying out motorcycle preparation activities and inspections	1.1	use suitable personal protective equipment and use suitable motorcycle coverings throughout all light motorcycle inspection activities			
		1.2	work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment			
2	Be able to use relevant information to carry out preparation activities and inspections of motorcycles	2.1	select suitable sources of technical information to support motorcycle inspection activities including: a motorcycle technical data b inspection procedures c legal requirements			
		2.2	use technical information to support motorcycle inspection activities			
3	Be able to use appropriate tools and equipment to carry out preparation activities and inspections of motorcycles	3.1	select the appropriate tools and equipment necessary for carrying out preparation and inspections			
		3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements			
		3.3	use the correct tools and equipment in the way specified by manufacturers when carrying out a range of inspections on motorcycle systems			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to carry out the preparation activities and inspections of motorcycles	4.1	carry out motorcycle preparation and inspections using prescribed methods, adhering to the correct specifications and tolerances for the motorcycle			
		4.2	ensure that inspected motorcycle conforms to the motorcycle operating specification and any legal requirements			
		4.3	ensure any comparison of the motorcycle against specification accurately identifies any differences from the motorcycle specification			
		4.4	use suitable testing methods to evaluate the performance of the inspected systems			
		4.5	complete all system diagnostic activities within the agreed timescale			
5	Be able to record information and make suitable recommendations	5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required			
		5.2	make suitable and justifiable recommendations for cost effective repairs			
		5.3	identify and report any expected delays in completion to the relevant person(s) promptly in the format required			
		5.4	record and report any additional faults noticed during the course of their work promptly in the format required			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

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Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 28: Knowledge of Diagnosis and Rectification of Motorcycle Engine Faults

Unit reference number: R/601/5566

QCF level: 3

Credit value: 6

Guided learning hours: 45

Unit Summary

This unit enables the learner to develop an understanding of diagnosis and rectification of engine mechanical, electrical, hydraulic and fluid systems. It also covers motorcycle engine systems and the evaluation of their performance.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Knowledge Unit Syllabus as set out below:

Single cylinder and multi-cylinder fuel injection systems

a the operation and construction of injection systems including:
   - i types of air flow/mass sensor
   - ii fuel supply system
   - iii fuel pump
   - iv filter
   - v fuel regulator
   - vi injectors
   - vii electronic control unit (ECU)
   - viii injector pulse width
   - ix sensors

b the operation of each system under various operating conditions including:
   - i cold starting
   - ii warm up
   - iii hot starting

iv acceleration

v deceleration

vi cruising

vii full load

c engine speed limiting and knock sensing

Engine management

a the function and purpose of engine management systems

b the difference between analogue, digital, programmable and non-programmable systems

c open loop and closed loop control, types of input and output devices

d the function and operation of digital components and systems

e the operation of engine management systems under various conditions

Valve mechanisms

a the reasons for variable valve timing and multi-valve arrangements and the effect on performance

b layout of multi-valve arrangements, components, operation and drive arrangements

c construction features and operation of variable valve timing engines and electronic control

Terms associated with combustion

a flame travel, pre-ignition and detonation

b fuel properties:

i octane rating

ii flash point

iii fire point

iv volatility

v composition of petrol fuels

vi hydro-carbon content

c composition of carbon fuels

d combustion process for spark ignition engines:

i air fuel ratio

ii lambda ratio

iii stoichiometric ratio

e the by-products of combustion for different engine conditions and fuel mixtures:

i CO

ii CO2

iii O

iv N

v H2O

vi NOx

f describe the legal requirements for exhaust emissions:

i MOT requirements

ii EURO regulations

Assessment, repair and restoration of mechanical engine components

a how engine mechanical components are assessed and measured for wear and serviceability:

i cylinder bores

ii cylinder heads

iii crankshaft journals

iv valve faces

v valve guides

vi valve seats

vii camshafts

b the methods used for the repair and restoration of engine components.

Symptoms and faults in engine mechanical systems and components

a symptoms and faults related to:

i worn cylinders

ii cylinder liners

iii pistons

iv piston rings

v crankshaft

vi camshaft

vii bearings

viii cylinder head and gasket

ix valves

x valve seats and valve guides

xi cambelts tensioned and pulleys

xii cam chains tension systems and guides

xiii lubrication system and components

xiv oil pump

xv relief valve

xvi filter

Diagnosis of faults in engine mechanical systems and components

a interpret information for:

i diagnostic tests

ii manufacturer's motorcycle and equipment specifications

iii use of equipment

iv testing procedures

v test plans

vi legal requirements

b the preparation of tools and equipment for use in diagnostic testing and assessment

c systematic assessment, testing and inspection of engine components and systems including:

i mechanical system & component condition

ii engine balance

iii power balance

iv performance and operation

v wear

vi run out

vii alignment

d use of appropriate tools and equipment including:

i compression gauges

ii leakage testers

iii cylinder balance tester

iv pressure gauges

v micrometers

vi vernier gauges

e evaluate and interpret test results from diagnostic testing

f compare test result and values with motorcycle manufacturer's specifications and settings

g the procedures for dismantling, components and systems and the use of appropriate equipment and procedures

h assess, examine and measure components including:

i settings

ii values

iii condition

iv wear and performance of components and systems

i probable faults
   i malfunctions
   ii incorrect settings
   iii wear
j rectification or replacement procedures

Evaluate operation of components and systems following diagnosis and repair to confirm system performance

Faults and symptoms in ignition systems

a ignition system failure or malfunctions including:
   i no spark
   ii misfiring
   iii backfiring
   iv cold or hot starting problems
   v poor performance
   vi pre-ignition
   vii detonation
   viii exhaust emission levels
   ix fuel consumption
   x low power
   xi unstable idle speed

Faults and symptoms in electronic petrol injection systems

a petrol injection system failures or malfunctions including:
   i cold or hot starting problems
   ii poor performance
   iii exhaust emissions
   iv high fuel consumption
   v erratic running
   vi low power
   vii unstable idle speed

Faults and symptoms in petrol carburetion systems

   i cold or hot starting problems
   ii poor performance
   iii exhaust emissions
   iv high fuel consumption
   v erratic running

vi low power

vii unstable idle speed

Faults and Symptoms in Engine Management Systems

a engine management system failure or malfunctions including:

i misfiring

ii backfiring

iii cold or hot starting problems

iv poor performance

v pre-ignition

vi detonation

vii exhaust emission levels

viii fuel consumption

ix low power

x unstable idle speed

Diagnosis of faults in electronic engine management systems

a locate and interpret information for:

i diagnostic tests

ii manufacturer's vehicle and equipment specifications

iii use of equipment

iv testing procedures

v test plans

vi fault codes

vii legal requirements

b the preparation of tools and equipment for use in diagnostic testing and assessment

c conduct systematic assessment, testing of engine systems including:

i component condition and performance

ii component settings

iii component values

iv electrical and electronic values

v system performance and operation

vi use of appropriate tools and equipment including gauges

vii multi-meter

viii breakout box

ix oscilloscope

x diagnostic tester

xi manufacturer's dedicated equipment

xii exhaust gas analyser

xiii pressure gauges

d evaluate and interpret test results from diagnostic testing

e compare test result, values and fault codes with motorcycle manufacturer's specifications and settings

f the procedures for dismantling, components and systems using appropriate equipment

g assess, examine and measure components including:

i settings

ii input and output values

iii voltages

iv current consumption

v resistance

vi output patterns with oscilloscope

vii condition

viii wear and performance of components and systems

h identify probable faults and indications of:

i faults

ii malfunctions

iii incorrect settings

iv wear

v values

vi inputs and outputs

vii fault codes

i rectification or replacement procedures

j evaluation and the operation of components and systems following diagnosis and repair to confirm system performance

i speed controls

ii control systems

k use of appropriate tools and equipment including:

i pressure gauges

ii multi-meter

iii breakout box

iv oscilloscope

v diagnostic tester

vi manufacturer's dedicated equipment

vii flow meter

e evaluate and interpret test results from diagnostic testing

f compare test result, values and fault codes with motorcycle manufacturer's specifications and settings

g how to dismantle, components and systems using appropriate equipment and procedures

h how to assess, examine and measure components including: settings, input and output values, voltages, current consumption, resistance, output patterns with oscilloscope, pressures, condition, wear and performance of components and systems

i identification of probable faults and indications of faults, malfunctions, incorrect settings, wear, values, inputs and outputs, fault codes, pressures and leaks

j rectification or replacement procedures

k evaluation and operation of components and systems following diagnosis and repair to confirm system performance

Construction and operation of motorcycle engine systems to include:

a engine mechanical

b lubrication systems

c fuel systems

d ignition systems

e cooling system

f air and exhaust systems

g engine management

Engineering principles that are related to motorcycle engine systems

a volumetric efficiency

b flame travel, pre ignition and detonation

c fuel properties

d composition of carbon fuels

e combustion process

f legal requirements for exhaust emissions

Symptoms and causes of faults found in motorcycle engine systems to include:

a engine mechanical

b lubrication systems

c fuel systems

d ignition systems

e cooling system

f air and exhaust systems

Engine management

Examine, measure and make suitable adjustments to the components including:

a settings

b input and output values

c voltages

d current consumption

e resistance

f output patterns with oscilloscope

g pressures

h condition

i wear and performance

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand how motorcycle engine systems operate	1.1	explain the construction and operation of motorcycle engine systems			
		1.2	explain the interaction between electrical, electronic and mechanical components within motorcycle engine systems			
		1.3	explain how electrical systems interlink and interact, including multiplexing and fibre optics			
		1.4	compare motorcycle engine system components and assemblies against alternatives to identify differences in construction and operation			
		1.5	identify the engineering principles that are related to motorcycle engine systems a volumetric efficiency b flame travel, pre ignition and detonation c fuel properties d composition of carbon fuels e combustion process			
2	Understand how to diagnose and rectify faults in motorcycle engine systems	2.1	describe how to analyse symptoms and causes of faults found in motorcycle engine systems			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		2.2	explain systematic diagnostic techniques used in identifying engine system faults			
		2.3	explain how to examine, measure and make suitable adjustments to the components			
		2.4	explain how to carry out the diagnosis and rectification activities in order to correct the faults in motorcycle engine systems			
		2.5	explain how to select, prepare and use diagnostic and rectification equipment for motorcycle engine systems			
		2.6	explain how to evaluate and interpret test results found in diagnosing motorcycle engine system faults against vehicle manufacturer specifications and settings			
		2.7	explain how to evaluate the operation of components and systems following diagnosis and repair to confirm system performance			

Learner name: _____ Date:_____

Learner signature: _____ Date:_____

Assessor signature: _____ Date:_____

Internal verifier signature: _____ Date:_____
(*if sampled*)

Unit 29: Skills in Diagnosing and Rectifying Motorcycle Engine Faults

Unit reference number: T/601/5625

QCF level: 3

Credit value: 5

Guided learning hours: 45

Unit Summary

This unit allows the learner to develop skills to diagnose and rectify motorcycle engine mechanical, electrical, hydraulic and fluid systems faults. It also covers the evaluation of performance of the replaced or repaired units and systems.

Assessment Requirements/Evidence requirements:

This unit must adhere to the IMI Skills Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre

3 be observed by an assessor as defined by the IMI Assessment Strategy

4 be observed by your assessor successfully carrying out the diagnosis and rectification of faults occurring in 2 **out of the 4** power train systems listed The faults should involve a **2 or more** step diagnostic activity

- engine mechanical systems
- engine management systems
- engine cooling systems
- engine lubrication systems

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work safely when carrying out motorcycle engine diagnostic and rectification activities	1.1	use suitable personal protective equipment and motorcycle coverings when using diagnostic methods and carrying out rectification activities			
		1.2	work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment			
2	Be able to use relevant information to carry out the task	2.1	select suitable sources of technical information to support motorcycle diagnostic and rectification activities including: a motorcycle technical data b diagnostic test procedures			
		2.2	use sufficient diagnostic information in a systematic way to enable an accurate diagnosis of motorcycle engine system faults			
3	Be able to use appropriate tools and equipment	3.1	select the appropriate tools and equipment necessary for diagnostic and rectification activities			
		3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements			
		3.3	use the equipment required, correctly and safely throughout all motorcycle engine diagnostic and rectification activities			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to carry out motorcycle engine diagnosis, rectification and test activities	4.1	use diagnostic methods that are relevant to the symptoms presented			
		4.2	evaluate your assessment of dismantled sub-assemblies and identify their condition and suitability for repair or replacement accurately			
		4.3	carry out all diagnostic and rectification activities following: a manufacturers' instructions b recognised researched repair methods c workplace procedures d health and safety requirements			
		4.4	ensure all repaired or replacement components and units conform to the motorcycle operating specification and any legal requirements			
		4.5	adjust components and units correctly to ensure that they operate to meet system requirements			
		4.6	use testing methods that are suitable for assessing the performance of the system rectified			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		4.7	ensure the rectified motorcycle engine system performs to the motorcycle operating specification and any legal requirements			
5	Be able to record information and make suitable recommendations	5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required			
		5.2	make suitable and justifiable recommendations for cost effective repairs			
		5.3	record and report any additional faults noticed during the course of their work promptly in the format required			

Learner name: _____ Date: _____

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Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 30: Knowledge in Diagnosis and Rectification of Motorcycle Chassis Fault

Unit reference number: D/601/5568

QCF level: 3

Credit value: 6

Guided learning hours: 45

Unit Summary

This unit enables the learner to develop an understanding of diagnosis and rectification of braking steering and suspension systems. It also covers motorcycle chassis systems and the evaluation of their performance.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Knowledge Unit Syllabus as set out below:

Electrical and electronic principles of motorcycle chassis systems

a the operation of electrical and electronic systems and components related to motorcycle chassis systems including:
   i ECU
   ii sensors and actuators
   iii electrical inputs
   iv voltages
   v oscilloscope patterns
   vi digital principles

b the interaction between the electrical/electronic system and mechanical components of chassis systems

c electronic and electrical safety procedures

Operation of electronic ABS and traction control systems

a layout of:
   i ABS and traction control systems
   ii warning systems

b operation of:
   i hydraulic and electronic control units
   ii wheel speed sensor
   iii hoses
   iv cables and connectors
c the relationship and interaction of braking with other motorcycle systems – traction control

Steering geometry for motorcycle applications

a front/rear wheel geometry

Symptoms and faults in braking systems

a symptoms and faults associated with braking systems:
   i mechanical
   ii hydraulic
   iii electrical and electronic systems
   iv fluid leaks
   v warning light operation
   vi poor brake efficiency
   vii wheel locking under braking

Diagnosis and faults in braking systems

a locate and interpret information for:
   i diagnostic tests
   ii motorcycle and equipment specifications
   iii use of equipment
   iv testing procedures
   v test plans
   vi fault codes
   vii legal requirements
b prepare equipment for use in diagnostic testing
c conduct systematic testing and inspection of:
   i braking system
   ii ABS
   iii traction control
   iv mechanical
   v hydraulic
   vi electrical and electronic systems

d using appropriate tools and equipment including:
   i multi-meters
   ii oscilloscope
   iii pressure gauges
e evaluate and interpret test results from diagnostic testing
f compare test result and values with motorcycle manufacturer's specifications and settings
g how to dismantle, components and systems using appropriate equipment and procedures
h assess, examine and evaluate the operation, settings, values, condition and performance of components and systems
i probable faults, malfunctions, incorrect settings
j rectification or replacement procedures
k operation of systems following diagnosis and repair to confirm operation and performance

Symptoms and faults associated with steering systems

a symptoms and faults associated with steering systems:
   i mechanical
   ii steering joints and bushes
   iii bearings

Diagnosis and faults in steering systems

a locate and interpret information for:
   i diagnostic tests
   ii motorcycle and equipment specifications
   iii use of equipment
   iv testing procedures
   v test plans
   vi legal requirements
b how to prepare equipment for use in diagnostic testing
c conduct systematic testing and inspection of:
   i steering systems
   ii mechanical
d using appropriate tools and equipment including:
   i wheel alignment equipment
e evaluate and interpret test results from diagnostic testing

f compare test result and values with motorcycle manufacturer's specifications and settings

g how to dismantle, components and systems using appropriate equipment and procedures

h assess, examine and evaluate the:

  i operation

  ii settings

  iii values

  iv condition and performance of components and systems

i probable faults, malfunctions, and incorrect settings

j rectification or replacement procedures

k operation of systems following diagnosis and repair to confirm operation and performance

Symptoms and faults associated with suspension systems

a symptoms and faults associated with suspension systems:

  i mechanical

  ii hydraulic

  iii ride height

  iv wear

  v noises under operation

  vi fluid leakage

  vii excessive travel

  viii excessive tyre wear

Diagnosis and faults in suspension systems

a locate and interpret information for:

  i diagnostic tests

  ii motorcycle and equipment specifications

  iii use of equipment

  iv testing procedures

  v test plans

  vi legal requirements

b how to prepare equipment for use in diagnostic testing

c how to conduct systematic testing and inspection of:

  i suspension systems

  ii mechanical

  iii hydraulic

d using appropriate tools and equipment including:

i alignment equipment

e evaluate and interpret test results from diagnostic testing

f compare test result and values with motorcycle manufacturer's specifications and settings

g how to dismantle, components and systems using appropriate equipment and procedures

h assess, examine and evaluate the operation, settings, values, condition and performance of components and systems

i probable faults, malfunctions and incorrect settings

j rectification or replacement procedures

k operation of systems following diagnosis and repair to confirm operation and performance

Construction and operation of motorcycle chassis systems to include:

a steering

b suspension

c Anti-lock-braking system(ABS)

d traction control

e front and rear wheel geometry

Engineering principles that are related to motorcycle chassis systems

a inertia force, mass and acceleration

b laws of friction

c static's

d hydraulic machines

Examine, measure and make suitable adjustments to the components including:

a settings

b input and output values

c voltages

d current consumption

e resistance

f output patterns with oscilloscope

g pressures

h condition

i wear and performance

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand how the motorcycle chassis systems operate	1.1	explain the construction and operation of motorcycle chassis systems			
		1.2	explain the interaction between electrical, electronic and mechanical components within motorcycle chassis systems			
		1.3	explain how motorcycle chassis electrical systems interlink and interact, including multiplexing			
		1.4	compare motorcycle chassis system components and assemblies against alternatives to identify differences in construction and operation			
		1.5	identify the engineering principles that are related to motorcycle chassis systems a inertia force, mass and acceleration b laws of friction c static's (springs and torsion) d hydraulic machines			
2	Understand how to diagnose and rectify faults in motorcycle chassis systems	2.1	explain symptoms and causes of faults found in motorcycle chassis systems			
		2.2	explain systematic diagnostic techniques used in identifying motorcycle chassis system faults			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		2.3	explain how to examine, measure and make suitable adjustments to the components			
		2.4	explain how to carry out the diagnosis and rectification activities in order to correct the faults in motorcycle chassis systems			
		2.5	explain how to select, prepare use diagnostic and rectification equipment for motorcycle chassis systems			
		2.6	explain how to evaluate and interpret test results found in diagnosing motorcycle chassis system faults against manufacturer specifications and settings			
		2.7	explain how to evaluate the operation of components and systems following diagnosis and repair to confirm system performance			

Learner name: _____ Date:_____

Learner signature: _____ Date:_____

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Internal verifier signature: _____ Date:_____
(*if sampled*)

Unit 31: Skills in Diagnosing and Rectifying Motorcycle Chassis System Faults

Unit reference number: Y/601/5634

QCF level: 3

Credit value: 5

Guided learning hours: 45

Unit Summary

This unit allows the learner to develop skills to diagnose and rectify motorcycle braking steering and suspension systems faults. It also covers the evaluation of performance of the replaced or repaired units and systems.

Assessment Requirements/Evidence requirements:

This unit must adhere to the IMI Skills Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre

3 be observed by an assessor as defined by the IMI Assessment Strategy

4 be observed by your assessor successfully carrying out the diagnosis and rectification of **1** fault occurring in **each** system listed The fault should involve a **2 or more** step diagnostic activity The evidence must include demonstration of skill in at least **1** of each: mechanical, electrical/electronic or hydraulic units or components

- Steering systems
- Suspension systems
- Braking systems

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work safely when carrying out motorcycle chassis diagnostic and rectification activities	1.1	use suitable personal protective equipment and use motorcycle coverings when using motorcycle diagnostic methods and carrying out rectification activities			
		1.2	work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment			
2	Be able to use relevant information to carry out the task	2.1	select suitable sources of technical information to support motorcycle diagnostic and rectification activities including: a motorcycle technical data b diagnostic test procedures			
		2.2	use sufficient diagnostic information in a systematic way to enable an accurate diagnosis of motorcycle chassis system faults			
3	Be able to use appropriate tools and equipment	3.1	select the appropriate tools and equipment necessary for diagnostic and rectification activities			
		3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements			
		3.3	use the equipment required, correctly and safely throughout all motorcycle chassis diagnostic and rectification activities			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to carry out motorcycle chassis diagnosis, rectification and test activities	4.1	use diagnostic methods that are relevant to the symptoms presented on a brakes b steering c suspension			
		4.2	evaluate your assessment of dismantled sub-assemblies and identify their condition and suitability for repair or replacement accurately			
		4.3	carry out all diagnostic and rectification activities following: a manufacturers' instructions b recognised researched repair methods c workplace procedures d health and safety requirements			
		4.4	ensure all repaired or replacement components and units conform to the motorcycle operating specification and any legal requirements			
		4.5	adjust components and units correctly to ensure that they operate to meet system requirements			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		4.6	use testing methods that are suitable for assessing the performance of the system rectified			
		4.7	ensure the rectified motorcycle chassis system performs to the motorcycle operating specification and any legal requirements			
5	Be able to record information and make suitable recommendations	5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required			
		5.2	make suitable and justifiable recommendations for cost effective repairs			
		5.3	record and report any additional faults noticed during the course of their work promptly in the format required			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

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Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 32: Skills in Diagnosing and Rectifying Motorcycle Transmission Faults

Unit reference number: H/601/5636

QCF level: 3

Credit value: 3

Guided learning hours: 25

Unit Summary

This unit allows the learner to develop skills to diagnose and rectify motorcycle transmission mechanical, electrical, and fluid systems faults. It also covers the evaluation of performance of the replaced or repaired units and systems.

Assessment Requirements/Evidence requirements:

This unit must adhere to the IMI Skills Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre

3 be observed by an assessor as defined by the IMI Assessment Strategy

4 be observed by your assessor successfully carrying out the diagnosis and rectification of faults occurring in **2** of the systems listed. The fault should involve a **2 or more** step diagnostic activity. The evidence must include demonstration of skill in at least **2** of the following: mechanical, electrical/electronic and hydraulic units or components

- clutch
- gearbox
- drive line (shafts, couplings, chains, sprockets, hubs and bearings)

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work safely when carrying out motorcycle transmission diagnostic and rectification activities	1.1	use suitable personal protective equipment and motorcycle coverings when using diagnostic methods and carrying out rectification activities			
		1.2	work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment			
2	Be able to use relevant information to carry out the task	2.1	select suitable sources of technical information to support motorcycle diagnostic and rectification activities including: a motorcycle technical data b diagnostic test procedures			
		2.2	use sufficient diagnostic information in a systematic way to enable an accurate diagnosis of motorcycle transmission system faults			
3	Be able to use appropriate tools and equipment	3.1	select the appropriate tools and equipment necessary for diagnostic and rectification activities			
		3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements			
		3.3	use the equipment required, correctly and safely throughout all motorcycle transmission diagnostic and rectification activities			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to carry out motorcycle transmission diagnosis, rectification and test activities	4.1	use diagnostic methods that are relevant to the symptoms presented			
		4.2	evaluate your assessment of dismantled sub-assemblies and identify their condition and suitability for repair or replacement accurately			
		4.3	carry out all diagnostic and rectification activities following: a manufacturers' instructions b recognised researched repair methods c workplace procedures d health and safety requirements			
		4.4	ensure all repaired or replacement components and units conform to the motorcycle operating specification and any legal requirements			
		4.5	adjust components and units correctly to ensure that they operate to meet system requirements			
		4.6	use testing methods that are suitable for assessing the performance of the system rectified			
		4.7	ensure the rectified motorcycle transmission system performs to the motorcycle operating specification and any legal requirements			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
5	Be able to record information and make suitable recommendations	5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required			
		5.2	make suitable and justifiable recommendations for cost effective repairs			
		5.3	record and report any additional faults noticed during the course of their work promptly in the format required			

Learner name: _____ Date: _____

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(*if sampled*)

Unit 33: Knowledge of Diagnosis and Rectification of Motorcycle Transmission and Driveline Faults

Unit reference number: L/601/5582

QCF level: 3

Credit value: 4

Guided learning hours: 30

Unit Summary

This unit enables the learner to develop an understanding of diagnosis and rectification of motorcycle gearboxes, hubs and bearings, driveline shafts, clutches, and final drive units. It also covers the evaluation of performance of the systems.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Knowledge Unit Syllabus as set out below:

Electrical and electronic principles related to motorcycle transmission systems

a the operation of electrical and electronic systems and components related to motorcycle transmission systems including:
   i Control units
   ii sensors and actuators
   iii electrical inputs & outputs
   iv voltages
   v oscilloscope patterns

b the interaction between the electrical/electronic system, and mechanical components of the transmission systems

c electronic and electrical safety procedures

The operation motorcycle clutches

a the construction and operation of friction clutches (wet, and dry) including single and multi-plate clutch designs

The operation of motorcycle transmissions and driveline systems

a the construction and operation of manual gearboxes:
   i gear arrangements
   ii shaft and bearing arrangements
   iii selector mechanisms
   iv linkages
   v lubrication

b the construction and operation of automatic gearboxes and method for achieving different gear ratios

c interaction between mechanical, electrical and electronic components

d the construction and operation of continuously variable transmissions (CVT) and the benefits of this type of gearbox design

e the construction and operation of final drive systems including:

f chain and sprocket

g belt systems
   i conventional crown wheel and pinion

h the construction and operation of motorcycle hub arrangements

i the construction and operation of:
   i drive shafts and couplings

Symptoms and faults in motorcycle transmissions and drive-line systems

a clutch and coupling faults:
   i abnormal noises
   ii vibrations
   iii fluid leaks
   iv slip
   v judder
   vi grab
   vii failure to release

b gearbox faults:
   i abnormal noises
   ii vibrations
   iii loss of drive
   iv difficulty engaging or disengaging gears
   v automatic gear box types
   vi abnormal noises
   vii vibrations

viii loss of drive

ix failure to engage gear

x failure to disengage gear

xi leaks

xii failure to operate

xiii incorrect shift patterns

xiv electrical and electronic faults

c final drive faults:

i abnormal noises

ii vibrations

iii loss of drive

iv oil leaks

v failure to operate

d drive-lines and couplings:

i abnormal noises

ii vibrations

iii loss of drive

Faults in motorcycle transmission systems

a interpret information for diagnostic tests, vehicle and equipment specifications, use of equipment, testing procedures, test plans, fault codes and legal requirements

b how to prepare equipment for use in diagnostic testing

c how to conduct systematic testing and inspection of transmission system, mechanical, hydraulic, electrical and electronic systems using appropriate tools and equipment including, mullet-meters,

d how to carry out workshop based and road testing of vehicle and transmission system

e evaluate and interpret test results from diagnostic and/or road testing

f compare test result and values with vehicle manufacturer's specifications and settings

g how to dismantle, components and systems using appropriate equipment and procedures

h assess, examine and evaluate the operation, settings, values, condition and performance of components and systems

i probable faults, malfunctions and incorrect settings

j rectification or replacement procedures

k operation of systems following diagnosis and repair to confirm operation and performance

Construction and operation of motorcycle transmission and driveline systems to include:

a clutches

b manual gearboxes

c automatics

d electronic control

e CVT (continuously variable transmission)

f chain and sprocket

g belt and pulley

h drive shaft

i final drive unit

j hubs

Advanced engineering principles that are related to motorcycle transmission and driveline systems

a friction

b torque transmission

c materials

d potential and kinetic energy

Symptoms and causes of faults found in motorcycle transmission and driveline systems to include:

a clutches

b manual gearboxes

c automatics

d electronic control

e CVT (continuously variable transmission)

f Chain and sprocket

g Drive shaft

h final drive unit

i hubs

Examine, measure and make suitable adjustments components including:

a settings

b input and output values

c voltages

d current consumption

e resistance

f output patterns with oscilloscope

g pressures

h condition

i wear and performance

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand how the motorcycle transmission and driveline systems operate	1.1	explain the construction and operation of motorcycle transmission and driveline systems			
		1.2	explain the interaction between electrical, electronic and mechanical components within motorcycle transmission and driveline systems			
		1.3	compare motorcycle transmission and driveline system components and assemblies against alternatives to identify differences in construction and operation			
		1.4	identify the advanced engineering principles that are related to motorcycle transmission and driveline systems a friction b torque transmission c materials d fluids & energy e potential & kinetic energy			
2	Understand how to diagnose and rectify faults in motorcycle transmission and driveline systems	2.1	explain the symptoms and causes of faults found in motorcycle transmission and driveline systems			
		2.2	explain systematic diagnostic techniques used in identifying advanced transmission and driveline system faults			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		2.3	explain how to examine, measure and make suitable adjustments components			
		2.4	explain how to carry out the rectification activities in order to correct the faults in the motorcycle transmission and driveline systems			
		2.5	explain how to select, prepare and use diagnostic and rectification equipment for motorcycle transmission and driveline systems			
		2.6	explain how to evaluate and interpret test results found in diagnosing motorcycle transmission and driveline system faults against manufacturer specifications and settings			
		2.7	explain how to evaluate the operation of components and systems following diagnosis and repair to confirm system performance			

Learner name: _____ Date: _____

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(*if sampled*)

Unit 34: Skills in Diagnosing and Rectifying Motorcycle Electrical Faults

Unit reference number: K/601/5590

QCF level: 3

Credit value: 3

Guided learning hours: 25

Unit Summary

This unit will help the learner to develop the skills required to demonstrate they can diagnose and rectify motorcycle auxiliary electrical system faults. It also covers the evaluation of performance of the replaced or repaired units and systems.

Assessment Requirements/Evidence requirements:

This unit must adhere to the IMI Skills Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre

3 be observed by an assessor as defined by the IMI Assessment Strategy

4 be observed by your assessor successfully carrying out the diagnosis and rectification of faults occurring in **3 out of the 5 electrical** systems listed. The faults should involve a **2 or more** step diagnostic activity

- lighting
- security and alarm
- information and entertainment
- telephone and two-way communication
- monitoring and instrumentation systems

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work safely when carrying out motorcycle electrical diagnostic and rectification activities	1.1	wear suitable personal protective equipment and use suitable motorcycle coverings throughout when carrying out electrical diagnostic and rectification activities			
		1.2	work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment			
2	Be able to use relevant information to carry out the task	2.1	select suitable sources of technical information to support motorcycle diagnostic and rectification activities including: a motorcycle technical data b diagnostic test procedures			
		2.2	use sufficient diagnostic information in a systematic way to enable an accurate diagnosis of motorcycle electrical system faults			
3	Be able to use appropriate tools and equipment	3.1	select the appropriate tools and equipment necessary for diagnostic and rectification activities			
		3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements			
		3.3	use the equipment required, correctly and safely throughout all motorcycle electrical diagnostic and rectification activities			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to carry out motorcycle electrical diagnosis, rectification and test activities	4.1	use diagnostic methods that are relevant to the symptoms presented			
		4.2	evaluate your assessment of dismantled sub-assemblies and identify their condition and suitability for repair or replacement accurately			
		4.3	carry out all diagnostic and rectification activities following: a manufacturers' instructions b recognised researched repair methods c workplace procedures d health and safety requirements			
		4.4	ensure all repaired and replaced components and units conform to the motorcycle operating specification and any legal requirements			
		4.5	adjust components and units correctly to ensure that they operate to meet system requirements			
		4.6	use testing methods that are suitable for assessing the performance of the system rectified			
		4.7	ensure the rectified motorcycle electrical system performs to the motorcycle operating specification and any legal requirements			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
5	Be able to record information and make suitable recommendations	5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required			
		5.2	make suitable and justifiable recommendations for cost effective repairs			
		5.3	record and report any additional faults noticed during the course of their work promptly in the format required			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

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Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 35: Knowledge of Diagnosis and Rectification of Motorcycle Electrical Faults

Unit reference number: M/601/5512

QCF level: 3

Credit value: 4

Guided learning hours: 30

Unit Summary

This unit enables the learner to develop an understanding of diagnosis and rectification of motorcycle electrical systems and their units. It also covers the evaluation of performance of the systems.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Knowledge Unit Syllabus as set out below:

The electrical principles that are related to motorcycle electrical circuits:

a Ohms law

b voltage

c power

d current (AC and DC)

e resistance

f magnetism

g electromagnetism and electromagnetic induction

h digital and fibre optic principles

i electrical units and symbols

j electrical and electronic terminology

k relevant electrical safety

Lighting systems and technology

a lighting systems should include:

i Xenon lighting

ii gas discharge lighting

iii ballast system

iv LED

v intelligent front lighting

vi blue lights

vii complex reflectors

viii fibre optic

ix optical patterning

Lighting circuits and the relationship between each circuit

a circuits must include:

i sidelights

ii dipped beam

iii main beam

iv dim/dip

Common faults and testing methods associated with external lighting system

a fault diagnosis for:

i lighting systems failing to operate correctly

ii switches

iii relays

iv bulbs failing to operate

The operating principles of external lighting systems and multiplexing systems

a to include all external lighting systems and a good knowledge of multiplexing systems

The different types of auxilary electrical components

a components should include:

i heated grip

ii electrically operated screens

iii horn

iv multi-functional switches

v relays

vi heated mirrors

Common faults and testing methods associated with heated mirror systems

a faults must include:

i screen elements not operating

ii timer relays not operating and staying on permanently

The different types of entertainment and information systems and components

a systems and components must include:

i radio CD and multi play units

ii MP3 players

iii speakers

iv aerial systems

v amplifiers

vi Satellite Navigation

vii communication units

Common faults and testing methods associated with entertainment and information systems

a faults to include:

i entertainment and navigation units not operating

ii speaker, aerial and amplifier systems not functioning correctly

iii excessive radio interference (suppression)

iv use of diagnostic computers and systems

The different types of integrated security / warning systems and components

a components to include:

i control units

ii alarm modules

iii audible warning units

iv immobiliser units

v sensing units

vi horn

vii audible warning speakers

The function of component parts in integrated security and warning systems

a components to include

i control units

ii alarm modules

iii audible warning units

iv immobiliser units

v relays

vi diodes

vii horns

The relevant legislation relevant to security and warning systems

a find and apply all relevant legislation for the fitment and use of security and warning systems

Common faults and testing methods associated with security and warning systems

a components to include:

i control units

ii audible warning units

iii immobiliser units

iv horns

v relays

vi diodes

vii wiring

viii connections and protection devices

ix removal and refitting procedures

x using computer diagnostics to identify faults

xi use of manufacturers diagnostic equipment

How to examine, measure and make suitable adjustments to components are:

a settings

b input and output values

c voltages

d current consumption

e resistance

f input and output patterns with oscilloscope (including frequency and duty cycle measurements)

g condition

h wear and performance

How to select, prepare and use diagnostic and rectification equipment for motorcycle auxiliary electrical systems:

a voltmeters

b ammeters

c ohmmeters

d multi-meters

e battery testing equipment

f dedicated and computer based diagnostic equipment

g oscilloscopes

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand motorcycle electrical and electronic principles	1.1	explain the principles of electrical inputs, outputs, voltages and oscilloscope patterns, digital and fibre optics			
		1.2	explain the principles of sensor inputs, computer processing and actuator outputs			
		1.3	identify sensor types (passive and active)			
		1.4	identify the electrical principles that are related to motorcycle electrical circuits			
2	Understand how motorcycle electrical systems operate	2.1	identify motorcycle electrical system components			
		2.2	explain the construction and operation of motorcycle electrical systems			
		2.3	explain the interaction between electrical, electronic and mechanical components within the system defined			
		2.4	explain how electrical systems interlink and interact, including multiplexing and fibre optics			
		2.5	compare motorcycle electrical system components and assemblies against alternatives to identify differences in construction and operation			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
3	Understand how to diagnose and rectify faults in motorcycle electrical systems	3.1	explain the symptoms and causes of faults found in motorcycle electrical systems			
		3.2	explain systematic diagnostic techniques used in identifying motorcycle electrical system faults			
		3.3	explain how to examine, measure and make suitable adjustments to components			
		3.4	explain how to carry out the rectification activities in order to correct the faults in the motorcycle electrical systems			
		3.5	explain how to select, prepare and use diagnostic and rectification equipment for motorcycle electrical systems			
		3.6	explain how to evaluate and interpret test results found in diagnosing motorcycle electrical system faults against motorcycle manufacturer specifications and settings			
		3.7	explain how to evaluate the operation of components and systems following diagnosis and repair to confirm system performance			

Learner name: _____ Date: _____

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(*if sampled*)

Unit 36: Knowledge of How to Make Learning Possible through Demonstrations and Instruction

Unit reference number: T/601/6242

QCF level: 3

Credit value: 5

Guided learning hours: 45

Unit Summary

This unit enables the learner to develop an understanding of how to carry out demonstrations and instruction which will help the learner to learn. It includes demonstrating equipment, showing skills, giving instruction, deciding when to use demonstration or instruction, potential of technology based learning, checking on learners' progress and giving feedback.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Knowledge Unit Syllabus as set out below:

Separate areas of demonstration which encourage learning. To include:

a demonstration is particularly applicable to learning manual skills

b learning to do something usually involves:

- i purpose – the aim or objective
- ii procedure – the most effective way of completing the task
- iii practice – all skills require practice to improve

c practical tasks are more quickly learnt through demonstration

d emphasis is required to body movements when demonstrating

e the demonstrator should encourage learners to ask questions

f emphasis should be placed upon key points whilst demonstrating

g any demonstration should ensure that all safety aspects are covered

Types of learning which are best achieved and supported through demonstrations. To include:

a types of learning:
   i psychomotor – measurement of manual skill performance
   ii cognitive – learning involving thought processes
   iii affective – demonstration of feelings, emotions or attitudes

b demonstration – involves learning to do something (Psychomotor Domain)

c combination of instruction and practical demonstrations are very effective means of learning practical skills

How to structure demonstration and instruction sessions. To include:

a before the demonstration and/or instruction ensure that the following good practice is recognised:
   i identify key points
   ii relate theoretical underpinning knowledge to key points
   iii rehearse to ensure that all equipment is working
   iv ensure all students can see even small equipment and processes
   v time the demonstration
   vi consider how to make students participate
   vii consider how to emphasise safe working practices

b during the demonstration and/or instruction good practice is to:
   i give a clear introduction
   ii identify any tools/equipment
   iii determine the current audience level of knowledge
   iv complete the demonstration correctly (do not show how not to do it)
   v stress key points and show links between them
   vi monitor safety aspects
   vii check learner understanding

c after the demonstration(if possible)
   i enable the audience to practice the techniques
   ii provide feedback on their performance

How to identify individual learning needs

a diagnose the learning needs of your audience to include:
   i what competencies they already have
   ii what experience they have of the subject area
   iii what competencies they need to achieve

iv what demonstration techniques are best suited to their needs

iv how you will assess their needs have been met

What factors are likely to prevent learning. To include:

a language barriers

b physical barriers

c specialist knowledge

d pace of learning

e method of delivery

f environmental factors

g teaching styles

h dyslexia

How to check learners understanding and progress

a questionnaires

b verbal questioning

c observation

d assessment

e role play

f projects/assignments

g multi-choice questions

h simulation

i tests

How to organise information and prepare materials

a identify the course aim

b identify the subject aim

c identify the lesson aim

d complete a lesson plan – plan the teaching

e identify a series of 'cues' to be used during the lesson

f logically organise the information

g use suitable resources and equipment to maximise learning opportunities

h assess the learners progress and understanding

Instructional techniques

a types of instructional techniques to include:

i lectures

ii handouts

iii team teaching

iv peer teaching

v discussion – individual, group and peer

vi question and answer

vii multimedia

viii seminars

ix case studies

x project/assignments

Environmental factors that effect learning

a environmental factors that should be considered before demonstration/instruction to include:

i loud noises

ii bright colours

iii bright lights

iv strong smells

v atmosphere

vi temperature

vii classroom seating

viii classroom layout

ix bright lights

Health and safety factors that effect learning

a health and safety factors that should be considered before demonstration/instruction to include:

i assessment of risk and hazards

ii condition of electrical/electronic equipment

iii position of cables and wires

iv safety of equipment used in demonstration/instruction

v condition of classroom equipment/furniture/structure

vi suitable protective clothing/equipment

Analysis of demonstration / instruction

a analysis of demonstration/instruction to include:

i feedback from students

ii feedback from colleagues

iii organisational quality assessment

iv feedback from external organisations

v awarding body requirements

Developments in learning To include:

a multimedia based materials

b web based materials

c interactive materials

How to choose and prepare appropriate materials To include:

a putting information in order

b deciding whether the language used is appropriate

c type of material ie paper and technology based etc

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Understand the nature and role of demonstrations and instruction	1.1	classify the separate areas of demonstrations which encourage learning			
		1.2	identify which types of learning are best achieved and supported through demonstrations			
		1.3	explain how to identify and use different learning opportunities			
		1.4	explain how to structure demonstrations and instruction sessions			
		1.5	explain how to choose from a range of demonstration techniques			
2	Understand the principles and concepts of demonstration and instruction	2.1	describe how to put learners at ease and encourage them to take part			
		2.2	justify the choice between demonstration and instruction as a learning method			
		2.3	explain how to identify individual learning needs			
		2.4	clarify which factors are likely to prevent learning and how to overcome them			
		2.5	explain how to check learners' understanding and progress			
		2.6	explain how to choose and prepare appropriate materials			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		2.7	explain the separate areas of instructional techniques which encourage learning			
		2.8	describe which types of learning are best achieved and supported through instruction			
3	Understand the external factors influencing human resource development	3.1	explain how to make sure everybody acts in line with health, safety and environmental protection, legislation and best practice			
		3.2	analyse developments in technology based learning and new ways of delivery			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 37: Skills in how to Make Learning Possible through Demonstrations and Instruction

Unit reference number: Y/601/6282

QCF level: 3

Credit value: 5

Guided learning hours: 40

Unit Summary

This unit will help the learner to develop the skills required to carry out demonstrations and instruction which will help the learner to learn. It includes demonstrating equipment, showing skills, giving instruction, deciding when to use demonstration or instruction, potential of technology based learning, checking on learners' progress and giving feedback.

Assessment Requirements/Evidence requirements:

This unit must adhere to the IMI Skills Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out in your training workshop as managed and organised by an approved centre

3 be observed by an assessor as defined by the IMI Assessment Strategy

4 provide **1 record** of an activity which has been a combination of demonstration and instruction

5 provide records of an **observation,** which covers **a combination** of **demonstration** and **instruction**

It is expected that the **records** must include evidence to show how you:

– decided on the sequence of the demonstration
– ensured that the demonstration was accurate and realistic
– identified which learning outcomes were achieved
– ensured a safe environment for the demonstration and allowed all learners to see the demonstration clearly

In preparing the record you should consider:

– which types of learning are best achieved and supported through demonstrations
– how to choose between instruction and demonstration as learning methods
– how to identify individual learning needs
– which factors are likely to prevent learning and how to overcome them
– how to choose and prepare appropriate materials, including technology based materials.
– which types of learning are best achieved through instruction
– how to make sure everybody acts in line with health, safety and environmental protection legislation and best practice
– how to analyse developments in learning and new ways of delivery, including technology based learning

It is also expected that evidence from your observations **will show** how you:

– structured the demonstration so that the learner got the most out of it
– encouraged learners to ask questions and get explanations at appropriate stages in the demonstration
– gave learners the opportunities to practice the skill being demonstrated
– gave learners positive feedback
– reinforced learning by repeating demonstration
– responded to the needs of learners during the demonstration
– reduced distractions and disruptions as much as possible
– matched instruction to the needs of learners
– ensured that the manner, level and speed of the instruction encourages learners to take part
– regularly check that learners understand and adapt instruction as appropriate
– gave learners positive feedback on the learning experience and the outcome achieved
– identified anything that prevented learning and reviewed this with the learner

Evidence from **real** or **simulated** activities and **role play is** acceptable for this unit.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to demonstrate skills and methods to learners	1.1	perform demonstrations based on an analysis of the skills needed and the order in which they must be learned			
		1.2	perform demonstrations that are accurate and realistic			
		1.3	perform structured demonstrations so that the learner can get the most out of it			
		1.4	perform demonstrations whilst encouraging learners to ask questions and get explanation at appropriate stages in the demonstration			
		1.5	provide positive feedback to learners whilst they are being given the opportunity to practise the skills that have been demonstrated			
		1.6	perform additional demonstrations of skills being taught to reinforce learning			
		1.7	perform demonstrations in a safe environment which also allows learners to see clearly			
		1.8	respond to the needs of the learners during demonstrations			
		1.9	reduce distractions and disruptions as much as possible			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
2	Be able to instruct learners	2.1	implement instruction which is matched to the needs of learners			
		2.2	use identified learning outcomes which can be achieved through instruction			
		2.3	perform instruction, ensuring that the manner, level and speed of the instruction encourages learners to take part			
		2.4	perform instruction whilst regularly checking that the learners understand and adapt instruction as appropriate			
		2.5	give learners positive feedback on the learning experience and the outcomes achieved			
		2.6	carry out a review with the learners to identify anything that prevented learning and adapt instruction as appropriate			

Learner name: _____ Date:_____

Learner signature: _____ Date:_____

Assessor signature: _____ Date:_____

Internal verifier signature: _____ Date:_____
(*if sampled*)

Unit 38: Competency in Diagnosing and Rectifying Motorcycle Engine Faults

Unit reference number: F/601/5501

QCF level: 3

Credit value: 10

Guided learning hours: 90

Unit Summary

This unit allows the learner to develop skills to diagnose and rectify motorcycle engine mechanical, electrical, hydraulic and fluid systems faults. It also covers the evaluation of performance of the replaced or repaired units and systems.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Competence Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out in your normal workplace or in a Realistic Work Environment as managed and organised by an approved centre

3 be observed by an assessor as defined by the IMI Assessment Strategy

4 be observed by your assessor successfully carrying out the diagnosis and rectification of faults occurring in 3 **out of the 4** power train systems listed. The faults should involve a **2 or more** step diagnostic activity

- engine mechanical systems
- engine management systems
- engine cooling systems
- engine lubrication systems

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work safely when carrying out motorcycle engine diagnostic and rectification activities	1.1	use suitable personal protective equipment and motorcycle coverings when using diagnostic methods and carrying out rectification activities			
		1.2	work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment			
2	Be able to use relevant information to carry out the task	2.1	select suitable sources of technical information to support motorcycle diagnostic and rectification activities including: a motorcycle technical data b diagnostic test procedures			
		2.2	use sufficient diagnostic information in a systematic way to enable an accurate diagnosis of motorcycle engine system faults			
3	Be able to use appropriate tools and equipment	3.1	select the appropriate tools and equipment necessary for diagnostic and rectification activities			
		3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements			
		3.3	use the equipment required, correctly and safely throughout all motorcycle engine diagnostic and rectification activities			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to carry out motorcycle engine diagnosis, rectification and test activities	4.1	use diagnostic methods that are relevant to the symptoms presented			
		4.2	evaluate your assessment of dismantled sub-assemblies and identify their condition and suitability for repair or replacement accurately			
		4.3	carry out all diagnostic and rectification activities following: a manufacturers' instructions b recognised researched repair methods c workplace procedures d health and safety requirements			
		4.4	ensure all repaired or replacement components and units conform to the motorcycle operating specification and any legal requirements			
		4.5	adjust components and units correctly to ensure that they operate to meet system requirements			
		4.6	use testing methods that are suitable for assessing the performance of the system rectified			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		4.7	ensure the rectified motorcycle engine system performs to the motorcycle operating specification and any legal requirements			
		4.8	complete all system diagnostic activities within the agreed timescale			
5	Be able to record information and make suitable recommendations	5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required			
		5.2	make suitable and justifiable recommendations for cost effective repairs			
		5.3	identify and report any expected delays in completion to the relevant person(s) promptly in the format required			
		5.4	record and report any additional faults noticed during the course of their work promptly in the format required			

Learner name: _____ Date: _____

Learner signature: _____ Date: _____

Assessor signature: _____ Date: _____

Internal verifier signature: _____ Date: _____
(*if sampled*)

Unit 39: Competency in Diagnosing and Rectifying Motorcycle Chassis System Faults

Unit reference number: L/601/5503

QCF level: 3

Credit value: 10

Guided learning hours: 90

Unit Summary

This unit allows the learner to develop skills to diagnose and rectify motorcycle braking steering and suspension systems faults. It also covers the evaluation of performance of the replaced or repaired units and systems.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Competence Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet all of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or as defined within the IMI VCQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk

3 be observed by an assessor as defined in the IMI VCQ Assessment Strategy

4 use a **2 or more** step diagnostic activity

5 produce evidence of diagnosing faults from **each** of the following areas:

- Steering systems
- Suspension systems
- Braking systems

2 pieces of evidence must come from work carried out **in your normal workplace.**

Your evidence **must** include the following areas: mechanical, electrical and hydraulic.

6 be observed by your assessor on **at least 2 occasions**, each observation covering the diagnosis and rectification of a fault in a different chassis system

Simulated activity **will be** acceptable to assess candidates' competence in diagnosis and rectification on no more than **1** occasion.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work safely when carrying out motorcycle chassis diagnostic and rectification activities	1.1	use suitable personal protective equipment and use motorcycle coverings when using motorcycle diagnostic methods and carrying out rectification activities			
		1.2	work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment			
2	Be able to use relevant information to carry out the task	2.1	select suitable sources of technical information to support motorcycle diagnostic and rectification activities including: a motorcycle technical data b diagnostic test procedures			
		2.2	use sufficient diagnostic information in a systematic way to enable an accurate diagnosis of motorcycle chassis system faults			
3	Be able to use appropriate tools and equipment	3.1	select the appropriate tools and equipment necessary for diagnostic and rectification activities			
		3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements			
		3.3	use the equipment required, correctly and safely throughout all motorcycle chassis diagnostic and rectification activities			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to carry out motorcycle chassis diagnosis, rectification and test activities	4.1	use diagnostic methods that are relevant to the symptoms presented			
		4.2	evaluate your assessment of dismantled sub-assemblies and identify their condition and suitability for repair or replacement accurately			
		4.3	carry out all diagnostic and rectification activities following: a manufacturers' instructions b recognised researched repair methods c workplace procedures d health and safety requirements			
		4.4	ensure all repaired or replacement components and units conform to the motorcycle operating specification and any legal requirements			
		4.5	adjust components and units correctly to ensure that they operate to meet system requirements			
		4.6	use testing methods that are suitable for assessing the performance of the system rectified			
		4.7	ensure the rectified motorcycle chassis system performs to the motorcycle operating specification and any legal requirements			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		4.8	complete all system diagnostic activities within the agreed timescale			
5	Be able to record information and make suitable recommendations	5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required			
		5.2	make suitable and justifiable recommendations for cost effective repairs			
		5.3	identify and report any expected delays in completion to the relevant person(s) promptly in the format required.			
		5.4	record and report any additional faults noticed during the course of their work promptly in the format required			

Learner name: _____ Date:_____

Learner signature: _____ Date:_____

Assessor signature: _____ Date:_____

Internal verifier signature: _____ Date:_____
(*if sampled*)

Unit 40: Competency in Diagnosing and Rectifying Motorcycle Transmission and Driveline faults

Unit reference number: K/601/5508

QCF level: 3

Credit value: 7

Guided learning hours: 58

Unit Summary

This unit allows the learner to develop skills to diagnose and rectify motorcycle transmission mechanical, electrical, and fluid systems faults. It also covers the evaluation of performance of the replaced or repaired units and systems.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Competence Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet all of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or as defined within the IMI VCQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk

3 be observed by an assessor as defined in the IMI VCQ Assessment Strategy

4 use a **2 or more** step diagnostic activity

5 produce evidence of diagnosing and rectifying at least **3** faults occurring in **3** of **the 3** systems listed*

- clutch
- gearbox
- drive line (shafts, couplings, chains, sprockets, hubs and bearings)

2 pieces of evidence must come from work carried out **in your normal workplace** in at least **2** of the following areas: mechanical, electrical or hydraulic.

6 be observed by your assessor on **at least 1 occasion** carrying out the diagnosis and rectification of a fault in a transmission or drive line system

*However, you must prove to your assessor that you have the necessary knowledge and understanding to be able to perform competently in respect of faults occurring in all the types of engine systems.

Simulated activity **will be** acceptable to assess candidates' competence in diagnosis and rectification on no more than **1** occasion.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work safely when carrying out motorcycle transmission diagnostic and rectification activities	1.1	use suitable personal protective equipment and motorcycle coverings when using diagnostic methods and carrying out rectification activities			
		1.2	work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment			
2	Be able to use relevant information to carry out the task	2.1	select suitable sources of technical information to support motorcycle diagnostic and rectification activities including: a motorcycle technical data b diagnostic test procedures			
		2.2	use sufficient diagnostic information in a systematic way to enable an accurate diagnosis of motorcycle transmission system faults			
3	Be able to use appropriate tools and equipment	3.1	select the appropriate tools and equipment necessary for diagnostic and rectification activities			
		3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements			
		3.3	use the equipment required, correctly and safely throughout all motorcycle transmission diagnostic and rectification activities			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to carry out motorcycle transmission diagnosis, rectification and test activities	4.1	use diagnostic methods that are relevant to the symptoms presented			
		4.2	evaluate your assessment of dismantled sub-assemblies and identify their condition and suitability for repair or replacement accurately			
		4.3	carry out all diagnostic and rectification activities following: a manufacturers' instructions b recognised researched repair methods c workplace procedures d health and safety requirements			
		4.4	ensure all repaired or replacement components and units conform to the motorcycle operating specification and any legal requirements			
		4.5	adjust components and units correctly to ensure that they operate to meet system requirements			
		4.6	use testing methods that are suitable for assessing the performance of the system rectified			
		4.7	ensure the rectified motorcycle transmission system performs to the motorcycle operating specification and any legal requirements			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		4.8	complete all system diagnostic activities within the agreed timescale			
5	Be able to record information and make suitable recommendations	5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required			
		5.2	make suitable and justifiable recommendations for cost effective repairs			
		5.3	identify and report any expected delays in completion to the relevant person(s) promptly in the format required			
		5.4	record and report any additional faults noticed during the course of their work promptly in the format required			

Learner name: _____ Date:_____

Learner signature: _____ Date:_____

Assessor signature: _____ Date:_____

Internal verifier signature: _____ Date:_____
(*if sampled*)

Unit 41: Competency in Diagnosing and Rectifying Motorcycle Electrical Faults

Unit reference number: Y/601/5441

QCF level: 3

Credit value: 7

Guided learning hours: 58

Unit Summary

This unit will help the learner to develop the skills required to demonstrate they can diagnose and rectify motorcycle auxiliary electrical system faults. It also covers the evaluation of performance of the replaced or repaired units and systems.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Competence Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet all of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out on real vehicles in your normal workplace or as defined within the IMI VCQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk

3 be observed by an assessor as defined in the IMI VCQ Assessment Strategy

4 use a **2 or more** step diagnostic activity

5 produce evidence of diagnosing and rectifying faults occurring in **4 out of the 5*** engine systems listed, **at least 3** of which must come from work carried out **in your normal workplace**

- lighting
- security and alarm
- information and entertainment
- telephone and two-way communication
- monitoring and instrumentation systems

6 be observed by your assessor on **at least 2 occasions**, **each** observation covering the diagnosis and rectification of a fault in **different** systems. **Both** of these observations must be carried out **in your normal workplace**

*However, you must prove to your assessor that you have the necessary knowledge and understanding to be able to perform competently in respect of faults occurring in all the types of engine systems.

Simulated activity **will be** acceptable to assess candidates' competence in diagnosis and rectification on no more than **1** occasion.

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to work safely when carrying out motorcycle electrical diagnostic and rectification activities	1.1	wear suitable personal protective equipment and use suitable motorcycle coverings throughout when carrying out electrical diagnostic and rectification activities			
		1.2	work in a way which minimises the risk of damage or injury to the motorcycle, people and the environment			
2	Be able to use relevant information to carry out the task	2.1	select suitable sources of technical information to support motorcycle diagnostic and rectification activities including: a motorcycle technical data b diagnostic test procedures			
		2.2	use sufficient diagnostic information in a systematic way to enable an accurate diagnosis of motorcycle electrical system faults			
3	Be able to use appropriate tools and equipment	3.1	select the appropriate tools and equipment necessary for diagnostic and rectification activities			
		3.2	ensure that equipment has been calibrated to meet manufacturers' and legal requirements			
		3.3	use the equipment required, correctly and safely throughout all motorcycle electrical diagnostic and rectification activities			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
4	Be able to carry out motorcycle electrical diagnosis, rectification and test activities	4.1	use diagnostic methods that are relevant to the symptoms presented			
		4.2	evaluate your assessment of dismantled sub-assemblies and identify their condition and suitability for repair or replacement accurately			
		4.3	carry out all diagnostic and rectification activities following: a manufacturers' instructions b recognised researched repair methods c workplace procedures d health and safety requirements			
		4.4	ensure all repaired or replacement components and units conform to the motorcycle operating specification and any legal requirements			
		4.5	adjust components and units correctly to ensure that they operate to meet system requirements			
		4.6	use testing methods that are suitable for assessing the performance of the system rectified			
		4.7	ensure the rectified motorcycle electrical system performs to the motorcycle operating specification and any legal requirements			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
		4.8	complete all system diagnostic activities within the agreed timescale			
5	Be able to record information and make suitable recommendations	5.1	produce work records that are accurate, complete and passed to the relevant person(s) promptly in the format required			
		5.2	make suitable and justifiable recommendations for cost effective repairs			
		5.3	identify and report any expected delays in completion to the relevant person(s) promptly in the format required.			
		5.4	record and report any additional faults noticed during the course of their work promptly in the format required			

Learner name: _____ Date:_____

Learner signature: _____ Date:_____

Assessor signature: _____ Date:_____

Internal verifier signature: _____ Date:_____
(*if sampled*)

Unit 42: Competency in Making Learning Possible through Demonstrations and Instruction

Unit reference number: Y/601/6380

QCF level: 3

Credit value: 5

Guided learning hours: 40

Unit Summary

This unit will help the learner to develop competency in order to carry out demonstrations and instruction which will help the learner to learn. It includes demonstrating equipment, showing skills, giving instruction, deciding when to use demonstration or instruction, potential of technology based learning, checking on learners' progress and giving feedback.

Assessment Requirements/Evidence requirements:

This unit must be assessed in accordance with the IMI Assessment Strategy *(Annexe C)* and adhere to the IMI Competence Unit Assessment Requirements as set out below:

You must:

1 produce evidence to show you meet **all** of the Learning Outcomes

2 produce performance evidence resulting from work you have carried out in your normal workplace or as defined within the IMI VCQ Assessment Strategy as managed and organised by an approved centre when naturally occurring performance evidence does not occur at frequent intervals in your normal workplace or when safety is at risk

3 be observed by an assessor as defined in the IMI VCQ Assessment Strategy **or** by a witness who has been previously agreed with the assessor prior to the observation taking place

4 provide at least **1 record** of an activity which has been demonstrated

5 provide records of at least **2 observations, 1** of which **must be** by your assessor, which cover at least **1 demonstration** and **1 instruction or a combination of both**

It is expected that the **records** must include evidence to show how you:

– decided on the sequence of the demonstration

– ensured that the demonstration was accurate and realistic

– identified which learning outcomes were achieved

– ensured a safe environment for the demonstration and allowed all learners to see the demonstration clearly

In preparing the records you should consider:

– which types of learning are best achieved and supported through demonstrations

– how to choose between instruction and demonstration as learning methods

– how to identify individual learning needs

– which factors are likely to prevent learning and how to overcome them

– how to choose and prepare appropriate materials, including technology based materials.

– which types of learning are best achieved through instruction

– how to make sure everybody acts in line with health, safety and environmental protection legislation and best practice

– how to analyse developments in learning and new ways of delivery, including technology based learning

It is also expected that evidence from your observations **will show** how you:

– structured the demonstration so that the learner got the most out of it

– encouraged learners to ask questions and get explanations at appropriate stages in the demonstration

– gave learners the opportunities to practice the skill being demonstrated

– gave learners positive feedback

– reinforced learning by repeating demonstration

– responded to the needs of learners during the demonstration

– reduced distractions and disruptions as much as possible

– matched instruction to the needs of learners

– ensured that the manner, level and speed of the instruction encourages learners to take part

– regularly check that learners understand and adapt instruction as appropriate

– gave learners positive feedback on the learning experience and the outcome achieved

– identified anything that prevented learning and reviewed this with the learner

Learning outcomes and assessment criteria

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
1	Be able to demonstrate skills and methods to learners	1.1	perform demonstrations based on an analysis of the skills needed and the order in which they must be learned			
		1.2	perform demonstrations that are accurate and realistic			
		1.3	perform structured demonstrations so that the learner can get the most out of it			
		1.4	perform demonstrations whilst encouraging learners to ask questions and get explanation at appropriate stages in the demonstration			
		1.5	provide positive feedback to learners whilst they are being given the opportunity to practise the skills that have been demonstrated			
		1.6	perform additional demonstrations of skills being taught to reinforce learning			
		1.7	perform demonstrations in a safe environment which also allows learners to see clearly			
		1.8	respond to the needs of the learners during demonstrations			
		1.9	reduce distractions and disruptions as much as possible			

Learning outcomes		Assessment criteria		Evidence type	Portfolio reference	Date
2	Be able to instruct learners	2.1	implement instruction which is matched to the needs of learners			
		2.2	use identified learning outcomes which can be achieved through instruction			
		2.3	perform instruction, ensuring that the manner, level and speed of the instruction encourages learners to take part			
		2.4	perform instruction whilst regularly checking that the learners understand and adapt instruction as appropriate			
		2.5	give learners positive feedback on the learning experience and the outcomes achieved			
		2.6	carry out a review with the learners to identify anything that prevented learning and adapt instruction as appropriate			

Learner name: _____ Date:_____

Learner signature: _____ Date:_____

Assessor signature: _____ Date:_____

Internal verifier signature: _____ Date:_____
(*if sampled*)

Further information

Our customer service numbers are:

BTEC and NVQ	0844 576 0026
GCSE	0844 576 0027
GCE	0844 576 0025
The Diploma	0844 576 0028
DiDA and other qualifications	0844 576 0031

Calls may be recorded for training purposes.

Useful publications

Related information and publications include:

- *Centre Handbook for Edexcel QCF NVQs and Competence-based Qualifications* published annually
- functional skills publications – specifications, tutor support materials and question papers
- *Regulatory Arrangements for the Qualification and Credit Framework* (published by Ofqual, August 2008)
- the current Edexcel publications catalogue and update catalogue.

Edexcel publications concerning the Quality Assurance System and the internal and standards verification of vocationally related programmes can be found on the Edexcel website.

NB: Some of our publications are priced. There is also a charge for postage and packing. Please check the cost when you order.

How to obtain National Occupational Standards

To obtain the National Occupational Standards go to www.ukstandards.org.uk.

Professional development and training

Edexcel supports UK and international customers with training related to NVQ and BTEC qualifications. This support is available through a choice of training options offered in our published training directory or through customised training at your centre.

The support we offer focuses on a range of issues including:

- planning for the delivery of a new programme
- planning for assessment and grading
- developing effective assignments
- building your team and teamwork skills
- developing student-centred learning and teaching approaches
- building functional skills into your programme
- building effective and efficient quality assurance systems.

The national programme of training we offer can be viewed on our website (www.edexcel.com/training). You can request customised training through the website or by contacting one of our advisers in the Training from Edexcel team via Customer Services to discuss your training needs.

The training we provide:

- is active
- is designed to be supportive and thought provoking
- builds on best practice
- may be suitable for those seeking evidence for their continuing professional development.

Annexe A: Progression pathways

The Edexcel qualification framework for the Automotive sector

Level	BTEC vocationally-related qualifications	BTEC specialist qualification / professional	NVQ / competence
5	BTEC Level 5 HND Diploma in Vehicle Operations Management (QCF)		
4	BTEC Level 4 HNC Diploma in Vehicle Operations Management (QCF)		
3		Edexcel BTEC Level 3 Diploma in Light Vehicle Maintenance and Repair Principles (QCF) Edexcel BTEC Level 3 Diploma in Heavy Vehicle Maintenance and Repair Principles (QCF) Edexcel BTEC Level 3 Diploma in Auto Electrical and Mobile Electrical Principles (QCF) Edexcel BTEC Level 3 Diploma in Vehicle Fitting Supervisory Principles (QCF) Edexcel BTEC Level 3 Diploma in Vehicle Accident Repair Body Principles (QCF) Edexcel BTEC Level 3 Diploma in Vehicle Accident Repair Paint Principles (QCF)	Edexcel Level 3 Diploma in Light Vehicle Maintenance and Repair Competence (QCF) Edexcel Level 3 Diploma in Heavy Vehicle Maintenance and Repair Competence(QCF) Edexcel Level 3 Diploma in Auto Electrical and Mobile Electrical Competence (QCF) Edexcel Level 3 Diploma in Vehicle Fitting Supervisory Competence (QCF) Edexcel Level 3 Diploma in Vehicle Accident Repair Body Competence (QCF) Edexcel Level 3 Diploma in Vehicle Accident Repair Paint Competence (QCF)

Level	BTEC vocationally-related qualifications	BTEC specialist qualification / professional	NVQ / competence
3		Edexcel BTEC Level 3 Diploma in Lift Truck Maintenance & Repair Principles (QCF) Edexcel BTEC Level 3 Diploma in Motorcycle Maintenance and Repair Principles (QCF) Edexcel BTEC Level 3 Diploma in Vehicle Sales Principles (QCF) Edexcel BTEC Level 3 Diploma in Body Building Principles (QCF)	Edexcel Level 3 Diploma in Lift Truck Maintenance and Repair Competence (QCF) Edexcel Level 3 Diploma in Motorcycle Maintenance and Repair Competence (QCF) Edexcel Level 3 Diploma in Vehicle Sales Competence (QCF) Edexcel Level 3 Diploma in Body Building Competence (QCF)
2		Edexcel BTEC Level 2 Diploma in Light Vehicle Maintenance and Repair Principles (QCF) Edexcel BTEC Level 2 Diploma in Heavy Vehicle Maintenance and Repair Principles (QCF) Edexcel BTEC Level 2 Diploma in Auto Electrical and Mobile Electrical Principles (QCF) Edexcel BTEC Level 2 Diploma in Vehicle Fitting Principles (QCF) Edexcel BTEC Level 2 Diploma in Vehicle Accident Repair Paint Principles (QCF) Edexcel BTEC Level 2 Diploma in Vehicle Accident Repair Body Principles (QCF)	Edexcel Level 2 Diploma in Light Vehicle Maintenance and Repair Competence(QCF) Edexcel Level 2 Diploma in Heavy Vehicle Maintenance and Repair Competence (QCF) Edexcel Level 2 Diploma in Auto Electrical and Mobile Electrical Competence (QCF) Edexcel Level 2 Diploma in Vehicle Fitting Competence (QCF) Edexcel Level 2 Diploma in Vehicle Accident Repair Paint Competence (QCF) Edexcel Level 2 Diploma in Vehicle Accident Repair Body Competence (QCF)

Level	BTEC vocationally-related qualifications	BTEC specialist qualification / professional	NVQ / competence
2		Level 2 Diploma in Lift Truck Maintenance & Repair Principles (QCF) Edexcel BTEC Level 2 Diploma in Motorcycle Maintenance and Repair Principles (QCF) Edexcel BTEC Level 2 Diploma in Vehicle Sales Principles (QCF) Edexcel BTEC Level 2 Diploma in Vehicle Accident Repair Mechanical, Electrical and Trim (MET) Principles (QCF) Edexcel BTEC Level 2 Diploma in Body Building Principles (QCF)Edexcel BTEC Edexcel BTEC Level 2 Diploma in Heavy Vehicle Trailer Maintenance & Repair Principles (QCF)	Edexcel Level 2 Diploma in Lift Truck Maintenance & Repair Competence (QCF) Edexcel Level 2 Diploma in Motorcycle Maintenance and Repair Competence (QCF) Edexcel Level 2 Diploma in Vehicle Sales Competence (QCF) Edexcel Level 2 Diploma in Vehicle Accident Repair Mechanical, Electrical and Trim (MET) Competence (QCF) Edexcel Level 2 Diploma in Body Building Competence (QCF) Edexcel Level 2 Diploma in Heavy Vehicle Trailer Maintenance & Repair Competence (QCF)
1			
Entry			

Annexe B: Centre certification and registration

Edexcel Standards Verifiers will provide support, advice and guidance to centres to achieve Direct Claims Status (DCS). Edexcel will maintain the integrity of Edexcel QCF NVQs through ensuring that the awarding of these qualifications is secure. Where there are quality issues identified in the delivery of programmes, Edexcel will exercise the right to:

- direct centres to take action
- limit or suspend certification
- suspend registration.

The approach of Edexcel in such circumstances is to work with the centre to overcome the problems identified. If additional training is required, Edexcel will aim to secure the appropriate expertise to provide this.

What are the access arrangements and special considerations for the qualifications in this specification?

Centres are required to recruit learners to Edexcel qualifications with integrity.

Appropriate steps should be taken to assess each applicant's potential and a professional judgement should be made about their ability to successfully complete the programme of study and achieve the qualification. This assessment will need to take account of the support available to the learner within the centre during their programme of study and any specific support that might be necessary to allow the learner to access the assessment for the qualification. Centres should consult Edexcel's policy on learners with particular requirements.

Edexcel's policy on access arrangements and special considerations for Edexcel qualifications aims to enhance access to the qualifications for learners with disabilities and other difficulties (as defined by the Equality Act 2010) without compromising the assessment of skills, knowledge, understanding or competence. Please refer to *Access Arrangements and Special Considerations for BTEC and Edexcel NVQ Qualifications* for further details. www.edexcel.com.

Please refer to Edexcel's Equality Policy for further details, www.edexcel.co/policies/pages/home.aspx

Assessment Strategy For

Vocational Competency Qualifications (VCQs)

Introduction

This document sets out the recommendations of IMI for the assessment of VCQ qualifications based on IMI developed National Occupational Standards. The Strategy is designed to operate across all four nations, bringing parity to all learners. Awarding Organisations wishing to operate VCQs in the retail motor sector must take full part in the IMI Awarding Body Forum.

This is the overarching strategy for the assessment and verification of competency based qualifications (VCQs) that are based upon National Occupational Standards from the IMI and

will come into force on the 30th June 2010, it will apply to any new competence based units and qualifications.

Assessment

VCQs are a type of qualification which reflects the unique needs of the workplace. They should be assessed in a holistic way by technically competent assessors. The primary method of assessment should always be direct workplace observation. Some use of simulation is allowed (please see section on Workplace Assessment/Simulation).

Additionally Awarding Organisations are encouraged to make use of naturally occurring quality assurance and monitoring systems where they exist in workplace assessment environments.

The Institute of the Motor Industry require Awarding Organisations delivering VCQs to participate in an Awarding Body Forum. This will, as a minimum, involve an annual meeting to discuss issues of assessment and verification.

VCQ must attest to competence in an occupational role (where competence is defined as the ability to apply knowledge, understanding, practical and thinking skills to be effective in work: these skills will usually include problem-solving, being flexible to meet changing demands and the ability to work with or alongside others).

Any assessment must attest to competence in an occupational role (where competence is defined as the ability to apply knowledge, understanding, practical and thinking skills to be effective in work: these skills will usually include problem-solving, being flexible to meet changing demands and the ability to work with or alongside others)

Evidence Requirements for VCQ

Candidates working towards a VCQ must provide evidence from the workplace that covers a minimum of a 4 month, (16 week), period.

All evidence for VCQs must be assessed by suitably qualified assessors and must adhere to the requirements for the QCF units being assessed.

Rules of combination

Rules of combination must be that determined by the IMI SSC.

Evidence other than from direct workplace observation

Workplace Assessment / Simulation

IMI credit based units are work/competency based and therefore candidates are to be assessed under normal workplace conditions. It is recognised however, that there are situations where the workplace may not be appropriate or that waiting for naturally occurring evidence is impractical. In these situations IMI will allow centres to set up or devise assessment situations.

These assessment situations can only be set up after:

- all possible routes for the collection of naturally occurring evidence have been exhausted.
- the exact make up and content of the centre devised assessment has been agreed and approved by the external verifier.
- the assessor can assure that the simulation will provide evidence that is valid reliable and authentic

We suggest that centres seek written confirmation before proceeding with assessment. The need for simulation may result from consideration of:

- Safety
- Legislation
- Regulation
- Contingency
- Cost
- Frequency

In addition, IMI recognises that candidates using these credit based units in the context of a Level 1 qualification may be in a learning environment and not in a workplace. In these situations, centres may set up or devise assessment situations as required, with prior written agreement of the external verifier.

Any simulation must be carried out using actual vehicles; the use of engine rigs or electrical boards is not permitted.

IMI re-iterates that its credit based units have been designed to be capable of assessment in the normal workplace and that subject to the arrangements for simulation described above this should be the case.

Simulation will be monitored by the Awarding Organisations and where it is found to be the ‘norm’ rather than the exception suitable action will need to be taken.

Realistic Work Environment

The IMI requires that candidates are assessed within their normal workplace, or in exceptional circumstances as described previously via simulation. The use of approved simulation means therefore that RWE, Realistic Work Environment is not to be used.

Expert Witnesses

The use of witness testimony and expert witness testimony are appropriate methods for assessors to collect supplementary evidence on candidates' performance.

Witness testimonies can be obtained from people that are occupationally competent and who may be familiar with the national occupational standards, such as the candidate's line manager.

The assessor must judge the validity of the witness testimony and these may vary depending on the source. Witness testimonies can only support the assessment process and may remove or reduce the need to collect supplementary evidence, however, the awarding organisation's/body's quality assurance requirements must be met. Additionally the person or persons providing the Witness Testimony evidence must make themselves available to the External Verifier for confirmation of evidence validity if required.

Remote Observation

The use of direct observation from a remote location is permitted as long as the centre seeks and receives the approval of their awarding organisation prior to its use and the awarding organisation discusses and agree this with the IMI prior to its use.

Assessor Requirements

The assessment of VCQs must be carried out by approved industry competent assessors.

Assessors will be responsible for, and accountable for, the validity, reliability and authenticity of evidence.

The primary responsibility of the assessor is to ensure that candidates satisfy the requirements of the national occupational standards. It is important that an assessor can recognise occupational competence as specified by the national occupational standards. Assessors therefore need to have a thorough understanding of assessment and quality assurance practices, as well as have in depth technical competence related to the qualifications for which they are assessing candidates.

It will be the responsibility of the approved centre to select and appoint assessors.

It will be the responsibility of the Awarding Organisation to approve centre selected assessors.

To be an approved assessor the person must:

- have sufficient and relevant technical/occupational competence in the Unit, at or above the level of the Unit being assessed
- have in depth knowledge of the Qualification or credit based unit evidence requirements.
- hold or be working towards a relevant assessors award as specified by the Institute of the Motor Industry. This will include, but not be limited to the Assessor qualifications, Level 3 Award in Assessing Competence in the Work Environment, Level 3 Award in Assessing Vocationally Related Achievement, Level 3 Certificate in Assessing Vocational Achievement. (and by implication legacy Assessor units A1, A2 and D32/33 unit) but may be an appropriate equivalent as defined by the IMI, SSC)..
- assessors working towards a relevant assessor qualification must achieve their qualification within 12 months.
- demonstrate knowledge and understanding of the competencies that a learner is required to demonstrate for the qualification that they are undertaking
- provide evidence of completing 5 days working/job shadowing in industry within their professional area in a 24 month period.
- provide evidence of 30 hours of technical/qualification related CPD within a 12 month period.(This is in additional to working/job shadowing).
- be approved by the Awarding Organisation to carry out assessments for the VCQs they are competent in.
- Approval of assessors can be removed.

Assessors **cannot** assess the VCQ if they are not currently approved by, or have had their approval removed by, the Awarding Organisation.

Internal Verifier Requirements

VCQs must be underpinned by quality assurance appropriate to workplace based delivery. At a minimum this should reflect the principles outlined below.

Internal Verification of VCQ shall be the responsibility of approved industry competent internal verifiers.

The primary responsibility of the internal verifier is to assure the quality and consistency of assessments by the assessors for whom they are responsible. Internal verifiers therefore need to have a thorough understanding of quality assurance and assessment practices, as well as technical competence related to the qualifications that they are internally verifying.

Internal verifiers will be responsible for, and accountable for consistency, quality and reliability of evidence and assessors.

It will be the responsibility of the approved centre to select and appoint internal verifiers .

It will be the responsibility of the Awarding Organisation to approve centre selected internal verifiers.

To be an approved internal verifier the person must:

- have in-depth knowledge of the occupational standards and credit based unit evidence requirements.
- be occupationally aware of the relevant industry sector being internally verified
- hold or be working towards a relevant verifier award as specified by the Institute of the Motor Industry. This will include, but not be limited to the Quality Assurance qualifications Level 4 Award in the Internal Quality Assurance of Assessment Processes and Practice, Level 4 Certificate in Leading the Internal Quality Assurance of Assessment Processes and Practice, (and by implication legacy Internal Verifier unit V1 D34 unit) but may be an appropriate equivalent as defined by the SSC.
- verifiers working towards a relevant qualification must achieve their qualification within 12 months.
- provide evidence of CPD totalling not less than 30 hours from within their professional area within a 12 month period.
- be approved by the Awarding Organisation to carry out internal verification for relevant VCQ(s)
- demonstrate knowledge and understanding of the quality assurance processes required by the centre and the awarding organisation

Approval of internal verifiers can be **removed.**

Internal Verifiers **cannot** verify the VCQ if they are not approved by, or have had their approval removed by the Awarding Organisation.

Multi Discipline Assessors and Internal Verifiers

Assessors and Internal Verifiers who work across multi disciplines must agree to a programme of CPD that will, over an agreed period of time, show their competence across all areas that they assess.

The programme of CPD and the timescale must be agreed for each multi discipline assessor by their External Verifier and may be subject to scrutiny by the IMI.

It is the responsibility of the centre to keep a record of these agreements.

External Verifier Requirements

Awarding Organisations will be responsible for selection and appointment of external verifiers.

To be an approved external verifier or moderator the person must:

- hold or be working towards an appropriate qualification as specified by the Institute of the Motor Industry, confirming their competence to externally verify VCQ assessments This will include, but not be limited to the Level 4 Award in Externally Assuring the Quality of Assessment Processes and Practice, Level 4 Certificate in Leading the External Quality Assurance of Assessment Processes and Practice, (and by implication legacy External Verifier unit V2 and D35 units) but may be an appropriate equivalent as defined by the SSC.
- external verifiers working towards a relevant qualification must achieve their qualification within 12 months.
- have experience of working within the Automotive Industry gained through current or prior employment in order to have an up to date technical awareness relevant to the VCQ they are seeking to externally verify
- have a sound and in-depth knowledge of the VCQ requirements
- demonstrate their commitment to maintaining their industry knowledge by providing evidence of CPD totalling not less than 30 hours from within their professional area within a 12 month period.

External Quality Control

It is expected that the awarding of qualifications will be underpinned by quality assurance appropriate to workplace based delivery. At a minimum this should reflect the principles outlined below.

External quality control of assessment is the responsibility of the Awarding Organisations, they must ensure that common approaches are employed and that consistent, high standards are achieved.

External verifiers will be required to implement rigorous risk management strategies consistently across all centres for which they are responsible.

IMI recommends that Awarding Organisations adopt a risk rating and risk management system for centres offering IMI VCQs.

IMI recommend that such systems identify:

- Commercial Risk – is there potential for commercial pressures to ensure that candidates achieve qualifications within unduly short time frames?
- Assessment/Verification risk – are factors apparent in the relationship between candidates, assessors and verifiers that might prejudice a fair and consistent assessment process?

Where risks or potential risks are identified, IMI expects that the Awarding Organisation, via the external verifier takes appropriate action to ensure that the credibility of the assessment process is not prejudiced.

Awarding Organisations will be responsible for and accountable for the quality of VCQs delivered and assessed by their approved assessment centres.

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For more information on Edexcel and BTEC qualifications please visit our website: www.edexcel.com

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