

**TEACHING PLAN**

**For use with**

**IMI Level 1 Diploma in Transport Maintenance**

**Qual I.D:**

601/8756/6 (G)

6018756/6 (LV)

601/8756/6 (HV)

601/8756/6 (MC)

***FOR ASSESSORS & QUALITY ASSURERS ONLY***

**TABLE OF CONTENTS**

[UNIT REF: L1MV01 - Health and Safety in the Workplace 4](#_Toc450560336)

[UNIT REF: L1MV02 - Locating, Interpreting and Using Technical Information 6](#_Toc450560337)

[UNIT REF: L1MV03 - Applying Engineering Techniques in an Automotive Environment 7](#_Toc450560338)

[UNIT REF: L1MV04 - Knowledge Relating to Automotive Foundation Skills 9](#_Toc450560339)

[UNIT REF: L1MV66 - Moving Loads and Vehicle Lifting 11](#_Toc450560341)

[UNIT REF: L1MV85 - Vehicle Materials and Joining Methods 13](#_Toc450560342)

[UNIT REF: L1MV86 - The Retail Motor Industry 13](#_Toc450560343)

[UNIT REF: L1MV87 - Knowledge Relating to Corrosion Protection 15](#_Toc450560344)

[UNIT REF: L1MV06 - Preparation to Become a Vehicle Driver 16](#_Toc450560345)

[UNIT REF: L1MV07 - Preparation for Riding a Motorcycle or Moped 17](#_Toc450560346)

[UNIT REF: L1MV08 - Reducing Risks When Driving Vehicles 19](#_Toc450560347)

[UNIT REF: L1MV09 - Introduction to Mobile Automotive Repair Trades 20](#_Toc450560348)

[UNIT REF: L1MV10 - Introduction to Business Enterprise 21](#_Toc450560349)

[UNIT REF: L1MV11 - Health and Safety Practices in a Maintenance and Repair Environment 23](#_Toc450560350)

[UNIT REF: L1MV12 - Tools, Equipment and Consumable Materials for Vehicle Maintenance 25](#_Toc450560351)

[UNIT REF: L1MV15 - Health and Safety Practices in a Valeting and Detailing Environment 28](#_Toc450560352)

[UNIT REF: L1MV16 - Tools, Equipment and Consumable Materials Used for Valeting and Detailing 30](#_Toc450560353)

[UNIT REF: L1MV17 - Health and Safety Practices in a Cycle Repair Environment 32](#_Toc450560354)

[UNIT REF: L1MV18 - Tools, Equipment and Consumable Materials Used for Cycle Maintenance and Repair 34](#_Toc450560355)

[UNIT REF: L1MV20 - Compression Ignition Engine System Components and Operation 36](#_Toc450560356)

[UNIT REF: L1MV21 - Air and Liquid Cooling System Components and Operation 37](#_Toc450560357)

[UNIT REF: L1MV22 - Lubrication System Components and Operation 38](#_Toc450560358)

[UNIT REF: ELMV25 - Introduction to Compression Ignition Fuel Systems 39](#_Toc450560359)

[UNIT REF: L1MV26 - Compression Ignition Fuel System Maintenance 40](#_Toc450560360)

[UNIT REF: ELMV21 - Vehicle Driveline Maintenance 41](#_Toc450560361)

[UNIT REF: ELMV20 - Routine Vehicle Maintenance Processes and Procedures 42](#_Toc450560362)

[UNIT REF: L1MV27 - Vehicle Steering and Suspension System Components and Maintenance (4 wheels or more) 43](#_Toc450560363)

[UNIT REF: L1MV19 - Spark Ignition Engine System Components and Operation 45](#_Toc450560364)

[UNIT REF: L1MV28 - Light Vehicle Braking System Components and Maintenance 46](#_Toc450560365)

[UNIT REF: L1MV29 - Light Vehicle Wheel and Tyre Construction and Maintenance 48](#_Toc450560366)

[UNIT REF: L1MV31 - Light Vehicle Exhaust System Components and Maintenance 49](#_Toc450560367)

[UNIT REF: ELMV22 - Spark Ignition System Maintenance 50](#_Toc450560368)

[UNIT REF: ELMV24 - Introduction to Spark Ignition Fuel Systems 51](#_Toc450560369)

[UNIT REF: L1MV34 - Heavy Vehicle Wheel and Tyre Construction and Maintenance 52](#_Toc450560370)

[UNIT REF: L1MV35 - Heavy Vehicle Exhaust System Components and Maintenance 53](#_Toc450560371)

[UNIT REF: L1MV36 - Heavy Vehicle Braking System Components and Maintenance 54](#_Toc450560372)

[UNIT REF: L1MV38 - Motorcycle Steering and Suspension System Components and Maintenance 56](#_Toc450560373)

[UNIT REF: L1MV39 - Motorcycle Braking System Components and Maintenance 58](#_Toc450560374)

[UNIT REF: L1MV40 - Routine Motorcycle Maintenance and Service Adjustment Processes 60](#_Toc450560375)

[UNIT REF: L1MV41 - Motorcycle Wheel and Tyre Construction and Maintenance 62](#_Toc450560376)

[UNIT REF: L1MV42 - Motorcycle Exhaust System Components and Maintenance 63](#_Toc450560377)

[UNIT REF: L1MV43 - Motorcycle Driveline Maintenance 64](#_Toc450560378)

[UNIT REF: L1MV44 - Motorcycle Fuel System Maintenance 65](#_Toc450560379)

[UNIT REF: L1MV45 - Motorcycle Spark Ignition System Maintenance 67](#_Toc450560380)

[UNIT REF: L1MV47 - Electrical Foundation Skills 69](#_Toc450560381)

[UNIT REF: L1MV48 - Lighting System Maintenance 70](#_Toc450560382)

[UNIT REF: L1MV76 - Vehicle Exterior Valeting and Detailing 71](#_Toc450560383)

[UNIT REF: L1MV77 - Engine Bay Valeting and Detailing 73](#_Toc450560384)

[UNIT REF: L1MV78 - Vehicle Interior Valeting and Detailing 75](#_Toc450560385)

[UNIT REF: L1MV79 - Cleaning and Treating of Fabric Folding Roofs 76](#_Toc450560386)

[UNIT REF: L1MV80 - Remove and Replace a Cycle Gear Assembly 77](#_Toc450560387)

[UNIT REF: L1MV81 - Carry Out a Systematic Cycle Check 79](#_Toc450560388)

[UNIT REF: L1MV82 - Repair a Cycle Puncture 81](#_Toc450560389)

[UNIT REF: L1MV83 - Remove and Replace a Cycle Rim Brake Assembly 83](#_Toc450560390)

[UNIT REF: L1MV46 - Electric Motorcycle Awareness 84](#_Toc450560391)

[UNIT REF: L1MV84 - Introduction to Electric Cycles 86](#_Toc450560392)

|  |  |
| --- | --- |
| UNIT REF: L1MV01 | **UNIT TITLE: HEALTH AND SAFETY IN THE WORKPLACE** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 21 Hrs**  |
| **Overview:** This unit introduces learners to the health and safety knowledge requirements when carrying out simple maintenance and repair tasks in the workplace. This unit covers the general requirements of health and safety in the workplace including personal responsibilities, common hazards and risks, manual handling, health and safety information, fire prevention and emergency evacuation procedures. Learners are required to complete a plan of the workplace highlighting the Health and Safety information, equipment and notices. |
| **Learning Outcomes:** |
| 1. **Know health and safety requirements and information used in the workplace**
2. **Know the safe manual handling techniques to be used in the workplace**
3. **Know the local legislation procedures associated with working in the workplace**
4. **Know about fire prevention and emergency procedures**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Health and safety requirements and information used in the workplace | 1.1-1.4 | Present and discuss with learners their personal and others responsibilities, hazards and risks of working in the workplace, highlight the consequences of in appropriate behaviour, failing to recognise hazards and risks.Highlight safe working practices, the purpose, use and reviews of risk assessments in the workplace.Have learners inspect the workplace to identify and record the locations of health and safety information and notices.Create questions and quizzes to test learners understanding and knowledge.Use of setting up a workplace with recognised hazards will enable learners to demonstrate hazard awareness and associated risks. Use HSE Website for examples of accidents in the workplace caused through neglect and poor housekeeping.  |
| Safe manual handling techniques to be used in the workplace | 2.1-2.2 | Present and discuss with learners the safe manual handling techniques, the types of equipment and their correct use to reduce the risk of personal injuries.Highlight the consequences of in not using the correct techniques and appropriate selection and use of equipment. Highlight safe working practices, the purpose, use and reviews of risk assessments in the workplace.Demonstrate to learners the practices of recognising and using appropriate techniques to move objects and components around the workplace to include: * jacking equipment
* cranes
* hoists
* chains, slings, chains and wire ropes
* vehicle lifts and stands
* skates and dollies
* trollies and sack trucks

Use HSE Web site for guidelines and legislation regarding manual handling.  |
| Local legislation procedures associated with working in the workplace | 3.1-3.2 | Present and discuss with learners the common main substances hazardous to health in the workplace including:* liquids – petrol, diesel, oil, brake fluid, cleaners, paint, thinners
* gases – exhaust, welding and heating equipment
* solids – used and contaminated components

Highlight the types of control measures to reduce the risks of harm and injury when using these substances.Present and discuss with learners the appropriate methods to dispose of waste materials in the workplace including:* waste oil and filters
* old units and components
* cleaning materials
* volatile materials – petrol filters, petrol engine components
* used vehicle body materials, paint, thinners

Highlight the legislation and the damage to the environment as a consequences of failing to dispose of materials in the correct manor. Use HSE Web site for guidelines and legislation regarding the disposal of waste materials, highlight prosecution cases to reinforce the importance.  |
| Fire prevention and emergency procedures | 4.1-4.3 | Present and discuss with learners the reasons for having emergency and evacuation procedures to include:* in the event of a colleague suffering an electric shock
* in the event of a serious accident
* sounding alarm
* use of appropriate fire extinguisher
* evacuation of premises

Use the workplace emergency and the evacuation procedure of the premises as part of learner’s induction process, learners to record the key contacts.Present and discuss with learners the three elements to produce a fire and the use of appropriate fire extinguishers to tackle the various fires likely in the workplace including:* liquids
* solids
* electrical

Use HSE Web site to highlight legislation and prosecution cases to reinforce the importance and awareness. |
| Complete Learner Worksheet | 1.1-5.3 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 29 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV02 | **UNIT TITLE: LOCATING, INTERPRETING & USING TECHNICAL INFORMATION** |

|  |  |
| --- | --- |
| **Level: Level 1** | **Guided Learning (GL): 12 Hrs** |
| **Overview:** This unit provides the learners with the basic knowledge in how to identify and access the technical information required to complete maintenance and repair activities. Learners will be expected to locate, interpret and use the technical information required for effective maintenance and repair procedures and activities.  |
| **Learning Outcomes:** |
| 1. **Know where to find technical information**
2. **Know the different types and location of technical information**
3. **Know how to locate identification numbers on vehicles and components**
4. **Be able to access, interpret and use technical information**
 |
| **Subject** | **AC** | **Teaching and Learning Methods** |
| Where to find technical information | 1.1-1.2 | Present and discuss the reasons for technicians to access and use current and accurate technical information during maintenance and repair activities. Identify a range of equipment and sources used to gather information. Service manuals, service publications, wall charts, micro-fiche, technical bulletins and computerised systems. |
| Different types and location of technical information | 2.1-2.2 | Present and discuss the various types of technical information sources available to the technician, to include advantages and disadvantages of each type: * Online workshop technical information sources
* Independent garage repair schemes
* Manufacturers online support services
* Vehicle owners workshop manuals
* Vehicle owners book

Use group work for learners to research the various types available.Devise questions and quizzes to check on learner’s knowledge and understanding.  |
| locate identification numbers on vehicles and components | 3.1-3.4 | Demonstrate the typical locations and reasons for accessing:* Chassis / frame number
* Vehicle registration number
* Engine number
* Component part numbers

Learners to locate and interpret vehicle registration, engine and component numbers from a variety of locations on the vehicle to be repaired or serviced |
| Complete Learner Worksheet | 1.1-4.2 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 17 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV03 | **UNIT TITLE: APPLYING ENGINEERING TECHNIQUES IN AN AUTOMOTIVE ENVIRONMENT**  |

|  |  |
| --- | --- |
| **Level:1** | **Guided Learning (GL): 13 Hrs** |
| **Overview:** This unit will provide the learner with the knowledge and skills to use engineering techniques to include: measuring, marking out, and drilling. The learner will use a variety of fixing methods to accurately fit vehicle number plates. |
| **Learning Outcomes:** |
| **1. Know how to select and wear the correct PPE and work safely****2. Know about vehicle materials** **3. Know how to use templates, and automotive / engineering tools** **4. Know a variety of mechanical and adhesive fixings and fastenings** |
| **Subject** | **AC** | **Teaching Methods** |
| Personal Protective Equipment | 1.1 | Provide a selection of PPE and devise tasks so that the learners can record what must be worn during drilling, measuring, marking out and using fastening activities. Facilitate group discussions on the learners' individual selections and the consequences of choosing the incorrect PPE.  |
| Vehicle materials  | 2.1 | Provide visual aids of different vehicle materials and devise tasks so that the learners can record the location the materials on vehicles. Demonstrate and show information which is used to successfully Identify:• Steel• Aluminium • Variations of PlasticFacilitate the learner's in identifying the different materials and provide a method of recording the information. Recap on the session by using a quiz to match the material to a use and/or location on a vehicle.  |
| Templates and automotive engineering tools  | 3.1, 3.2 | Provide a selection and variations on the tools which are used for (these can be images):* Measuring
* Marking out
* Drilling
* Fixing and securing mechanical fastenings

Develop worksheets to enable the learner's to label and identify the use of the individual tools. Encourage group activities and feedback sessions. Use videos and instructions on the techniques which are used to complete the listed tasks. Set up activities measuring and marking out exercises.Provide examples of different templates and methods which are appropriate for fitting vehicle number/registration plates. Facilitate the learners to discuss the main advantages of preparing and using templates, prior to fitting vehicle number plates. Provide evidence of vehicle number/registration plates which have been incorrectly fitted.Record the results of the discussions.  |

|  |  |  |
| --- | --- | --- |
| Mechanical and adhesive fastenings  | 4.1 | Provide examples of different types of fixings and fastenings, which are suitable to secure vehicle number plates to include:• Mechanical • AdhesiveDiscuss where the fixings and fastenings are suitable to use and facilitate the learners in identifying the correct choice.  |
| Complete the learner worksheet  | 1.1, 2.1, 3.1, 3.2, 4.1 | Provide supplementary materials to support the completion of the worksheet. Explain the layout of the worksheet and ensure the learners understand how to complete it.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 17 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV04 | UNIT TITLE: KNOWLEDGE RELATING TO AUTOMOTIVE FOUNDATION SKILLS |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 17 Hrs**  |
| **Overview:**  This unit will enable the learner to develop the knowledge for tools, equipment, measuring devices and materials used in simple repair, servicing, maintenance activities and the materials used in vehicle construction:Learning outcome 1 relates to the knowledge required when using a range of mechanical measuring and electrical equipment, locking and securing devices, hand tools and workshop equipment used within a workplace environment.Learning outcome 2 introduces the learners to the range of materials and their applications used in vehicle construction. |
| **Learning Outcomes:** |
| 1. **Know the basic tools, equipment and measuring devices used within a workplace environment**
2. **Know the materials used in vehicle construction**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Main units of measurement and measuring equipment related to repair and automotive environment.  | 1.1-1.2 | Present and discuss the common units of measurement and tools and equipment found in automotive repair, to include: Units of measurement* Length, Area, Volume, Mass, Force, Velocity, Pressure, Temperature, Torque.

Measuring equipment* Rule/Tape, Calliper, Feeler Gauge, Volume Measures, Vernier Calliper, Micrometer, Dial Gauges, Torque Wrenches, Multimeter, Pressure gauge

Use a variety of teaching and learning opportunities to enable learners use measuring equipment to measure common components / work areas, eg. Workshop length, width and volume calculations using a tape measure. Devise activities for learners to complete, provide extra support for those who may struggle.  |
| Basic principles of electrical circuits/ components and electrical measuring equipment.  | 1.3-1.4 | Present and discuss basic electrical circuits and component concepts.Build a simple lighting circuit using:* Series and parallel circuits
* Battery, wiring, switch and lighting bulb circuit

Introduce learners to: Voltage, Current and resistance terms.Use ohms law to calculate the current flowing in the circuit.Use electrical tools and measuring equipment to build and check for correct circuit operation. |
| Locking and securing devices used in an automotive environment | 1.5 | Present and discuss the common locking and securing devices used in the automotive industry, to include: * Fixing devices; nuts, bolts and screws,
* Screw threads, types and applications
* Locking and securing devices; lock nuts, split pins, locking wire, tab washers, chemical thread locking

Devise activities and worksheets where learners can identify and record the use of different nuts, bolts and thread applications.Devising a practical activity using a range of components above would be beneficial in furthering learners knowledge and understanding.  |
| Common hand tools and workshop used in an automotive environment | 1.6 | Present and discuss the common hand tools used in the automotive environment, to include:* Files, hacksaw, hammers, screwdrivers, pliers, types of spanner, sockets, torque wrenches, feeler gauge, micrometer, punches, air drill, electrical hand drill, drill bits, vices, taps and dies, broken stud removers,

Demonstrate the use and care of the common tools.Devise activities where learners can use the tools above in a real life workshop situation.  |
| 1.7 | Present and discuss the workshop equipment used in the automotive environment, to include:* hydraulic jacks /scissor jacks, axle stands / paddock stands, pillar drills, air tools, vehicle lifts, cranes, hoists, dollies, skates

Demonstrate the use and care of the workshop equipment.Devise activities where learners can use the workshop equipment above in a real life workshop situation.  |
| Ferrous, non-ferrous and non-metallic materials, and their application in vehicle construction | 2.1-2.2 | Present and discuss the reasons and the applications of the ferrous, nonferrous and non-metallic materials used in vehicle construction and components, including:* carbon steel, steel alloys, cast iron, aluminium, brass, copper, lead
* Glass, safety glass, reinforced plastic, Kevlar, rubber

Devise activities for learners to identify and record the various uses on a vehicle where these materials are used. Use Q&A supported with Quizzes’ to check on learners knowledge and understanding.  |
| Common terms applied to the materials used in vehicle construction | 2.3 | Present and discuss the common terms associated with metals and vehicle materials including: * Hardness, toughness, ductility, elasticity, tenacity, malleability, plasticity
* Tensile stress, compressive stress, yield stress, shear force

Devise activities for learners to identify and record the qualities of the various metals used on the range of vehicle components. Use Q&A supported with Quizzes’ to check on learner’s knowledge and understanding. |
| Complete Learner Worksheet | 1.1-2.3 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 25 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV66 | **UNIT TITLE: MOVING LOADS AND VEHICLE LIFTING** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 15 Hrs**  |
| **Overview:**  This unit introduces the learner to the knowledge and skills essential for the safe working operations when manually lifting, moving loads and when using manual handling equipment. The unit also covers the use of vehicle lifting and securing equipment, learners are required to use effective and safe working practices whilst using this equipment. |
| **Learning Outcomes:** |
| 1. **Know the risks of manual handling and moving loads.**
2. **Know appropriate methods of lifting, moving and securing heavy loads.**
3. **Know safe manual handling procedures.**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Risks of manual handling and moving loads. | 1.1-1.4 | Present and discuss with learners the PPE that should be worn when moving loads including:* Safety boots, safety hat, overalls, safety gloves, reflective jacket/tabard.

Introduce learners to the HSE Web site where information and legislation on manual handling can be found, explain the reason and purpose of guidelines and legislation. Present and discuss with learners the local manual handling operating regulations and guidelines that individuals and employers need to follow. Highlight the typical risks of injury during lifting and moving to:* Arms, legs and joints, slips, trips, and repetitive strain injuries of various sorts.

Present, discuss and demonstrate safe manual handling techniques, considerations to be taken before, during and when placing objects down.  |
| Methods of lifting, moving and securing heavy loads. | 2.1-2.4 | Highlight the types of equipment employers must provide for moving heavy loads and the use of risk assessments by employees to reduce the risks of injury.Introduce learners to a range of lifting and moving equipment they are likely to use in their work environment, explain and demonstrate its correct use.Devise activities for learners to be able to select, secure and move objects and loads using the equipment and the techniques shown, including:* use of PPE
* safe working loads (SWL) lifting capacity
* care when moving loads over uneven surfaces
* appropriate selection of equipment for the task
* avoiding obstructions and floor based obstacles- cables and leads
* safe working environment for equipment being used
* stability of loads whilst being moved
* condition and well maintained equipment

Provide feedback where necessary to enable learners to be fully aware of the potential risks of injury or harm. Devise questions and answer activities to check on learners understanding and knowledge.Demonstrate the visual inspection checks to include:* leaks and mechanical condition
* physical damage
* seized or broken components
* correct operation of components
* damaged wiring
* cuts and frayed straps
* cracks and bent structures
* certificates of conformity (insurance)
 |
| Know safe manual handling procedures. | 3.1-3.3 | Discuss and demonstrate moving loads manually to include: * safe personal lifting limits
* use of PPE
* planning the lift
* adopting a safe position
* feet position
* where is the load going to
* will I need help with lifting the load
* removal of obstructions from packaging
* will I need to change grip in moving the load

Discuss and demonstrate lifting and moving loads using equipment to include: * working within the Safe Working Limits (SWL) of the equipment
* training and authorised to use mechanical equipment
* equipment condition
* follow safe procedures when using mechanical equipment
* informing others
* reporting of faults of equipment to authorised persons
* safe, secure and level ground loads will be transported across
* using equipment risk assessments

Discuss and demonstrate the methods and precautions to be taken when using lifting and supporting a vehicle to include: * inspect the floor jack or lift for fluid leaks before use
* using vehicle manufacturer specifications for vehicle weight.
* using manufacturer specifications for axle stand capacity.
* following correct procedure when using floor jacks and vehicle lifts
* ensure the vehicle is placed on a hard, level surface
* raising the vehicle using manufacturer specified lifting points
* when the vehicle is raised, it must be supported
* chock wheels before removing the jack
* use vehicle manufacturer specifications for vehicle weight.

Devise worksheets for the activities above for learners to complete as part of the learning process. |
| Complete Learner Worksheet | 1.1-5.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 22 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV85 | **UNIT TITLE: VEHICLE MATERIALS AND JOINING METHODS**  |

|  |  |
| --- | --- |
| **Level:1** | **Guided Learning (GL): 17 Hrs** |
| **Overview:** This unit will provide the learner with the knowledge and skills to identify and locate a range of vehicle materials, joining methods and chassis layouts. |
| **Learning Outcomes:** |
| **1. Know different vehicle construction materials and their applications** **2. Know different methods of constructing vehicles** **3. Know the properties of vehicle construction materials** **4. Know different types of chassis design**  |
| **Subject** | **AC** | **Teaching Methods** |
| Vehicle construction materials and their applications | 1.1,1.2 | Provide examples or visual aids for the following construction materials:* glass
* plastic
* mild steel
* high strength steel
* aluminium
* carbon fibre
* fibreglass / glass reinforced plastic

Devise activities and worksheets which will aid the learners in identifying the listed vehicle construction materials.Provide examples of where the construction materials are located on vehicle bodies. Discuss and record the applications for different vehicle construction materials, for example carbon fibre is used to produce lightweight body panels and trim. |
| Methods of constructing vehicles | 2.1, 2.2 | Provide visual examples of different methods of assembling vehicles such as vehicle manufactures' automated assembly lines and vehicle manufacturers which choose to use hand built methods to produce vehicles. Discuss advantages and disadvantages of each method. Proved visual examples of different methods of joining vehicle panels and structures and facilitate the learners in identifying each method.  |
| Vehicle construction materials | 3.1 | Discuss and provide evidence of the main properties which are required for vehicle construction materials. Devise activities and experiments to demonstrate the properties of materials and facilitate discussions on why they are suitable for specific applications, for example corrosion resistance and crumple zones.Facilitate the recording of the learners' findings and observations.  |
| Chassis design | 4.1 | Provide visual evidence of chassis designs to include: separate chassis / ladder chassis and monocoque.Facilitate the learners in identifying the two chassis designs.Organise a group visit to a vehicle manufacturers' factory / assembly line in conjunction with a project or knowledge task to reinforce the knowledge which has been gained in this unit.  |
| Complete the learner worksheet  | 1.1 - 4.1 | Provide supplementary materials to support the completion of the worksheet. Explain the layout of the worksheet and ensure the learners understand how to complete it.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 21 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV86 | **UNIT TITLE: THE RETAIL MOTOR INDUSTRY** |

|  |  |
| --- | --- |
| **Level:1** | **Guided Learning (GL): 13 Hrs** |
| **Overview:** This unit will provide the learner with the knowledge of organisations within the retail motor industry, in addition to this, the learner will identify trade associations and how to qualify for professional registers. |
| **Learning Outcomes:** |
| **1. Know vehicle repair organisations within the retail motor industry****2. Know different trade associations** **3. Know the benefits of automotive professional registers** |
| **Subject** | **AC** | **Teaching Methods** |
| Repair organisations within the retail motor industry | 1.1, 1.2, 1.3, 1.4, 1.5, 1.6 | Devise activities which highlights the different types of vehicle repair organisations within the retail motor industry.Discuss and provide examples of a basic structure of a vehicle repair business, assist the learners' in producing an organisational structure and discuss the reasons for the layout / structure. Compare a franchised dealership with an independent workshop and facilitate a discussion to include the differences between them and any advantages and disadvantages. Discuss the main procedures which are involved when receiving a vehicle for repair, provide worksheets for the learners to record the list of procedures. Discuss different methods of communication methods which are used in a vehicle workshop or dealership. Facilitate the learners in communication activities and record what communication methods are appropriate for specific situations. Provide examples of a range of information which is used in a vehicle repair environment. Discuss the different formats of information and devise activities which will aid the learners in identifying each one.  |
| Trade associations | 2.1, 2.2  | Provide information on a range of trade associations and devise a straightforward research activity to locate information on an organisation. Facilitate the learners in feeding back information on trade associations. Discuss and record the benefits of trade associations  |
| Automotive professional registers | 3.1,3.2,3.3 | Provide information on, or arrange a guest speaker to discuss automotive professional registers, in addition to this promote how to qualify for professional registers and the benefits of them.Assist the learners' in joining trade organisations or qualifying for professional registers.  |
| Complete the learner worksheet  | 1.1 - 3.3 | Provide supplementary materials to support the completion of the worksheet. Explain the layout of the worksheet and ensure the learners understand how to complete it.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 14 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV87 | **UNIT TITLE: KNOWLEDGE RELATING TO CORROSION PROTECTION** |

|  |  |
| --- | --- |
| **Level:1** | **Guided Learning (GL): 10 Hrs** |
| **Overview:** This unit will provide the learner with the knowledge of how to protect vehicle bodies from corrosion by applying suitable products to areas such as: the backside of panels and vehicle body cavities. |
| **Learning Outcomes:** |
| **1. Know the purpose of the corrosion protection process.** **2. Know the tools and equipment which are used to apply corrosion protection materials.****3. Know how to apply corrosion protection materials.****4. Know how to prevent damage to corrosion protection materials.** |
| **Subject** | **AC** | **Teaching Methods** |
| The purpose of corrosion protection  | 1.1,1.2 | Discuss and provide worksheets for the learners to record the reasons for applying corrosion protection materials. Provide visual aids, repair methods and vehicle sections to allow the learners to identify areas where corrosion protection materials are used. Provide images and videos to show the consequences of not applying corrosion protection materials.  |
| Tools and equipment | 2.1,2.2,2.3 | Provide examples of tools and equipment to enable thelearner's to identify what applications they are used for and observe the variations in their designs. Issue worksheets to record the information about the tools andequipment. Provide the equipment manufacturers instructions and instructional videos on how to set up the corrosion protection equipment. Facilitate the learners in groups to outline how to set up the equipment for different uses and attachments. |
| Applying corrosion protection materials  | 3.1,3.2,3.3 | Provide the product data sheets and worksheets so that the learners can identify and record the information which supportsthe application process. Discuss a variety of products and their appropriate uses.Provide images, product data and manufacturers videos to demonstrate the application of the products. Facilitate the learners in recording the application process and the differentmethods of applying the products.  |
| Preventing damage to corrosion protection  | 4.1,4.2 | Provide visual examples of how corrosion protection materials may become damaged and the effects on the life of the vehicle. Facilitate a group discussion to highlight and record how to prevent corrosion protection materials on a vehicle from becoming damaged.Develop and use a true or false quiz to recap on the session.  |
| Complete the learner worksheet  | 1.1 -4.2 | Provide supplementary materials to support the completion of the worksheet. Explain the layout of the worksheet and ensure the learners understand how to complete it.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 12hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV06 | **UNIT TITLE: PREPARATION TO BECOME A VEHICLE DRIVER** |

|  |  |
| --- | --- |
| **Level:1** | **Guided Learning (GL): 9 Hrs** |
| **Overview:** This unit will provide the learner with the knowledge which learner drivers need to know before they begin to drive. This includes applying for their first driving licence, becoming familiar with the Highway Code, arranging driving lessons and booking the driving test. |
| **Learning Outcomes:** |
| **1. Know the process of applying for their first driving licence** **2. Know the purpose of the Highway Code** **3. Know the meaning of a sample of road safety signs** **4. Know how to identify an approved driving school and instructors****5. Know the content of both the theory and practical driving tests** |
| **Subject** | **AC** | **Teaching Methods** |
| Applying for a first driving licence | 1.1, 1.2, 1.3, 1.4 | Discuss the process of applying for a first driving licence and devise a 'mock' application to aid the learner in becoming familiar with the type of information which is require when applying for a first driving licence.Discuss and record the reasons why a person may be refused a first licence. Arrange a guest speaker from a driving association or the local Police to discuss how to remain safe when in charge of a vehicle.  |
| The Highway Code | 2.1, 2.2, 2.3 | Discuss the purpose of the Highway Code and provide examples of the contents. Devise activities which will aid the learners in locating information within the highway code.  |
| Road safety signs | 3.1 | Devise activities / quizzes to promote the meaning of common road signs. Use video of driving footage to observe road signs and facilitate group work to feedback the meaning of the ones which were spotted.  |
| Driving school and instructors | 4.1, 4.2  | Discuss and record things to consider when choosing a driving school and instructor. Provide contact information of organisations which can deal with poor service or behaviour froma driving school or driving instructor.Arrange a guest speaker from a driving school to discuss lessons and the standards which driving instructors must adhere to.  |
| The theory and practical driving tests | 5.1, 5.2, 5.3, 5.4, 5.5  | Devise simple research activities to aid the learners' in identifying the content and timescale of the:* Driving theory test
* Practical driving test

Provide information on local driving test centres and aid the learners in locating the nearest one to them. Devise an activity which allows the learners to locate information on the different methods of booking a driving test andwhat documents must be produced at the test centre. Discuss vehicle problems and faults which may prevent it being used for the driving test. Facilitate the learners in recording the list of faults.  |
| Complete the learner worksheet  | 1.1 - | Provide supplementary materials to support the completion of the worksheet. Explain the layout of the worksheet and ensure the learners understand how to complete it.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 10hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV07 | **UNIT TITLE: PREPARATION FOR RIDING A MOTORCYCLE OR MOPED** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 7 Hrs**  |
| **Overview:** This unit will provide the learner with the knowledge which learner riders will need to know before they begin to ride a motorcycle on a public highway. This includes applying for their first driving licence, becoming familiar with the Highway Code, arranging riding lessons and booking the riding test. |
| **Learning Outcomes:** |
| 1. **Know the process of applying for their first driving licence**
2. **Know the purpose of the Highway Code**
3. **Know the meaning of a sample of road safety signs**
4. **Know how to identify an approved training body school and instructors**
5. **Know the content of both the theory and practical riding tests**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Applying for a first driving licence | 1.1-1.4 | Present and discuss the application process for a first driving licence to include:* how to apply – various stages / process
* provisional licence – restrictions, use of red L plates, no carrying of unqualified passengers and motorways etc.
* requirements to qualify for a provisional licence – reasons for being prevented from riding
* where to apply for a provisional licence
* methods of application – post, online etc.
* when / age to apply

Devise learner worksheets, use group work and question and answer activities to enable learners to use and research the DVSA Web site to locate the information. |
| Purpose of the Highway Code | 2.1-2.3 | Present and discuss the purpose of the highway code to include:* why it is essential – help reduce road casualties
* who it applies to - road users and pedestrians
* legal implications in the Highway Code – may be prosecuted if disobeyed and used in evidence
* content – information for road users, pedestrians, and road signs
* formats: audiobook, app, paperback book, etc

Use group work tasks to cover AC 2.1-2.3 to enable learners to research the assessment criteria and present their findings back to the group. Facilitate the learners feedback and provide further details where required.  |
| Road safety signs | 3.1 | Present and discuss the meanings of the different shapes and colours of road signs in use to include:* shapes
* colours
* meanings
* mandatory
* warning
* regulatory
* speed limits

Devise and use Warning, Mandatory and Instruction signs where learners have to match the sign to the information.Use question and answer activities to check on learners understanding and knowledge, provide support where required.  |
| Approved training body school and instructors | 4.1-4.2 | Present and discuss the preparation requirements and how to find an approved training body school and instructors to include:* legal safety equipment for riding a motorcycle, crash helmet, visors and goggle safety standards approval
* suggested PPE for riding a motorcycle
* Compulsory Basic Training (CBT) , valid duration of CBT
* CBT limits of engine capacity and power output restrictions (DL196)
* driver and Vehicle Standards Agency
* L plates rules – colour and positioning
* finding riding lessons and instructors – display badges, pricing, offers, reputation and courses.
* complaints about an approved instructor - Trading Standards Office and Citizens Advice Bureau (for poor service) Driver and Vehicle Standards Agency (for unacceptable behaviour and illegal instructors)
* rules for practising with family and friends - see current rules for supervising learner riders

Use group work tasks to cover AC 4.1-4.2 to enable learners to research the assessment criteria and present their findings back to the group, for instance using the DVSA and training school providers Web sites to find the required information, facilitate the learners feedback and provide further details where required. |
| Theory and practical riding tests | 5.1-5.5 | Present and discuss the theory and practical motorcycle riding tests to include: Theory. * how to book a test – indicate any additional needs orrequirements prior to the test, for example dyslexia.
* content of the test – timescale, format and practise material
* how to locate a theory test centre – research methods, Government websites

Practical.* booking the riding test – highlight any additional needs or requirements before the test
* purpose of the test – ride safely in different road and traffic conditions, know the Highway Code and meet the standard required.
* documents to take to the test – theory test certificate and driving licence
* what happens during the test – timescale, manoeuvres, types of instruction, routes and know current riding standards
* motorcycle rules and suitability if used during a riding test – correct documentation, meet the required speed limits, correctly fitted L plates, no warning lights permanently illuminated - check current requirements

Use group work tasks to cover AC 5.1-5.5 to enable learners to research the assessment criteria and present their findings back to the group, for instance using the DVSA Web site to find the required information, facilitate the learners feedback and provide further details where required. |
| Complete Learner Worksheet | 1.1-5.5 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 10 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV08 | **UNIT TITLE:** **REDUCING RISKS WHEN DRIVING VEHICLES** |

|  |  |
| --- | --- |
| **Level:1** | **Guided Learning (GL): 14 Hrs** |
| **Overview:** This unit is aimed at pre-learner drivers and novice drivers. The unit content will provide the learner with the knowledge and skills, which will aid in them in reducing risks by preparing the vehicle and taking responsibility for their behaviour when planning to learn to drive and driving vehicles. |
| **Learning Outcomes:** |
| **1. Know different types of vehicle pre-use checks** **2. Know the consequences of failing to carryout pre-use vehicle checks** **3. Know the how to reduce risks when driving vehicles** |
| **Subject** | **AC** | **Teaching Methods** |
| Pre-use vehicle checks | 1.1, 1.2 | Discuss the importance of pre-use vehicle checks.Use video footage or images to show the types of checks which must be carried out. Facilitate the learners in groups to produce a list of pre-use checks.Provide vehicle support information to highlight the different types of fluid and coolants which need checking and adjusting.Use real vehicles, images or video footage to support how to top-up the fluid and coolant levels. Produce worksheets which support and record the processes.  |
| The consequences of failing to carry out pre-use vehicle checks | 2.1 | Give examples of the consequences of failing to carry out pre-use vehicle checks and use straightforward scenarios to highlight the importance of meticulous checks. These will include: * vehicle breakdowns
* poor vision
* accidents / collisions
* fines and convictions
* leaks
* unpredictable vehicle handling

Facilitate the learners in completing and feeding back on the scenarios. |
| How to reduce risks when driving vehicles | 3.1 | Discuss and devise exercises which promote how to reduce risks when driving vehicles. Support the session with guest speakers, for example, road safety representatives. Record the main points of the session and make copies for the learners. Promote the idea of putting the lists in the learners own vehicle or a vehicle which they purchase in the future as a recap on how to reduce risks when driving.  |
| Complete the learner worksheet  | 1.1 - 3.1 | Provide supplementary materials to support the completion of the worksheet. Explain the layout of the worksheet and ensure the learners understand how to complete it.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 17hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV09 | **UNIT TITLE:** **INTRODUCTION TO MOBILE AUTOMOTIVE REPAIR TRADES**  |

|  |  |
| --- | --- |
| **Level:1**  | **Guided Learning (GL): 10 Hrs** |
| **Overview:** This unit will provide the learner with the knowledge of different types of mobile vehicle repair services and their role within the automotive industry. |
| **Learning Outcomes:** |
| **1. Know a range of automotive trades which carry out mobile repairs****2. Know the benefits of mobile repair trades****3. Know the limitations of mobile repair trades** |
| **Subject** | **AC** | **Teaching Methods** |
| Automotive trades which carry out mobile repairs | 1.1, 1.2 | Provide evidence of and discuss the variety automotive trades which carry out mobile repairs.Facilitate the learners in carrying out straightforward research (in groups) to highlight examples of the services which each of the trades provide.Discuss and record the feedback from each group.Arrange guest speakers to provide information on mobile repairs. Facilitate a question and answer session.  |
| The benefits of mobile repair trades | 2.1 | Discuss and record the advantages of mobile repair services to include:* The customer seeing the repair taking place
* The customer being able to communicate directly with the technician
* The repair being carried out at a place convenient to the customer therefore, saving time and effort for the customer
 |
| The limitations of mobile repair trades | 3.1 | Discuss and facilitate group activities to highlight instances where a mobile repair service may not be recommended, this may include:* size and extent of the repair
* suitability of the working environment
* working space / area which is available
* legal implications, for example fumes, noise or the location of the vehicle

Record the results of the discussion.Assist the learners in researching the amount of job opportunities which are available in mobile repair trades. |
| Complete the learner worksheet  | 1.1 -3.1 | Provide supplementary materials to support the completion of the worksheet. Explain the layout of the worksheet and ensure the learners understand how to complete it.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 11hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV10 | **UNIT TITLE: Introduction to BUSINESS ENTERPRISE** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 12 Hrs**  |
| **Overview:** This unit will provide learners with the knowledge and skills required to develop business and enterprise ideas. |
| **Learning Outcomes:** |
| 1. **Know the behavioural characteristics and qualities that define an entrepreneur**
2. **Know how to recognise and resource a business idea**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Characteristics and qualities that define an entrepreneur | 1.1-1.2 | Present and discuss with learners the common qualities and behaviours that entrepreneurs demonstrate in business, to include:Qualities. * Business focused
* Confident
* Creative thinking
* Delegation skills
* Determination
* Independent
* Risk taker

Behaviours.* Positive attitude
* Purpose driven
* Influencer
* Planner
* Evaluator
* Leader
* Objectiveness
* Calculating
* Self-imposed standards
* Enthusiastic

Set a task for learners to work in small groups, present learners with the names of a range of well-known business entrepreneurs and have them investigate their business background. Learners to map the key qualities and behaviours above to that of the entrepreneur.Groups to provide feedback on the entrepreneurs working background and their journeys to becoming a business person.  |
| Recognising and resourcing a business idea | 2.1-2.4 | Present and discuss where business ideas may come from and identifying opportunities as a result, to include: * Local and National newspapers
* Radio
* TV
* Internet and social media
* Market research
* Friends and family
* Post office and newsagents
* Tendering
* Local and regional maps
* Scanning economic and social scenes

Highlight that scanning the local and regional business landscape provides individuals with inelegance to help identify and plan business opportunities. Discuss with learners the typical resources that may be required to develop a business opportunity, include: * human
* finances
* environment
* tools and equipment
* results of market research

Present and discuss with learners the reasons why project planning in a very important part of estimating the viability of a business idea before embarking on development, include estimates of:* business demand
* income
* expenditure
* profit
* time frames for individual elements of plan
* staffing needs
* workplace needs
* training needs of staff
* tracking progress

Highlight the learner’s next steps in developing a project or business idea in LO3: 3.1-3.4 where they will be able to apply their knowledge and skills. Explain and have learners set short and long term targets in their business project which is reviewed regularly.Provide regular reviews and feedback to support learner’s development of the business idea.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 20 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV11 | **UNIT TITLE: HEALTH AND SAFETY PRACTICES IN A MAINTENANCE AND REPAIR ENVIRONMENT** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 14 Hrs**  |
| **Overview:**  This unit further develops the learner’s awareness of Health and Safety in the workplace by putting into practice the knowledge gained from unit L1MV01. Learners will further develop the knowledge in identifying hazards and risks, and be able to: demonstrate safe working practices using a variety of tools, equipment and consumable materials whilst carrying out routine maintenance and simple repair tasks in an automotive maintenance and repair environment. |
| **Learning Outcomes:** |
| 1. **Know the hazards and risks associated with working in the automotive environment.**
2. **Know how to work safely in the automotive environment.**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Hazards and risks associated with working in the automotive environment. | 1.1-1.3  | Present and discuss with learners the hazards and associated risks when working in a maintenance and repair environment, to include: * slip and trip hazards, hazardous substances, electric shock, explosion of tyres, poor ventilation, battery charging, falling objects, movement of heavy loads

Hazards and risks associated with cleaners and lubricants to include: * flammable liquids, skin irritation, chemical burns, swallowing fluids, fluid in eyes, fire hazards

Present and discuss the reasons for Health and Safety information found on cleaning and lubrication products.* on packaging of chemicals
* manufactures websites
* notices issued by local authority’s
* health and Safety Executive Web site (HSE)
* risk assessments

Introduce learners to the HSE Web site and a range of products supplies to find legislation and information surrounding the storage and safe use of cleaning and lubrication products. Devise questions and answer sheets for learners to complete and demonstrate their understanding, provide appropriate feedback where necessary. Present and discuss the good housekeeping routines associated with vehicle maintenance and repair to include: * keeping work area clean of debris
* floors cleaned
* chemicals stored correctly
* bins emptied
* correct disposal of waste material
* prompt disposal and storage of waste materials
* prompt cleaning of spillages
* regular cleaning of work area
* storage of tools and equipment
* correct storage of flammable liquids

Simulate a poorly maintained work environment covering subjects and topics in AC 1.1-1.3 with a range of hazards: have learners complete a devised hazard and risk identification task sheet to check their understanding and knowledge. Discuss with the group their findings and provide appropriate feedback to further develop the group’s knowledge.  |
| Working safely in the automotive environment. | 2.1-2.2 | Present and discuss the appropriate selection of PPE and VPE for a range of maintenance and repair activities, include: * overalls
* safety boots
* skin protection
* eye protection
* ear protection
* dust mask
* seat covers
* steering wheel protectors
* wing covers
* floor mats

Devise questions and answer activities, group work and use of ILT to check on learner’s knowledge and understanding. Present and discuss the safe working practices to be used in the workplace.Having learners complete a risk assessment prior to an activity would be a good source of checking their current knowledge. Use of appropriate video clips to identifying good and poor working practice in the work environment will help to check learner’s knowledge and assist them being able to identify good and bad practice, and what to do as a result. Include: * use of PPE and VPE
* use of stands and supporting aids
* location of fire extinguishers
* following safety instructions
* correct use of tools and equipment

Including tools and equipment:* electrical equipment – blown fuses, damaged cables
* identifying unsafe hand tools - damaged hand tools
* identifying unsafe equipment – broken / missing components
 |
| Complete Learner Worksheet | 1.1-5.2 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 20 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV12 | **UNIT TITLE: TOOLS, EQUIPMENT AND CONSUMABLE MATERIALS FOR VEHICLE MAINTENANCE** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 15 Hrs**  |
| **Overview:** This unit will provide learners with the knowledge and skills to be able to select, check and use tools and equipment used for vehicle maintenance and repairs, the unit also covers the appropriate selection and use of consumable materials used during maintenance and repair activities |
| **Learning Outcomes:** |
| 1. **Know a range of tools and equipment used in vehicle maintenance and repair**
2. **Know a range of consumable materials used in vehicle maintenance and repair.**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Tools and equipment used in vehicle maintenance and repair | 1.1-1.3 | Present and discuss, the range and purpose of tools and equipment used in vehicle maintenance and repair to include:Hand tools:* spanners – open end, ring, combination, speed and ratchet types)
* screwdrivers – flat blade, Phillips, pozidrive
* hammers – ball pein, lump, copper/hide, rubber, neoprene
* chisels
* saws – hacksaw, junior hacksaw
* steel rule and tape measure
* allen keys
* vice grips
* socket sets – different drive sizes, specialist socket and screw bits, stud
* remover adaptor
* pliers and grips – long nose, engineers, side snips/cutters, pipe grips, mole grips
* torque wrench
* feeler blades
* tyre tread depth gauges

Equipment to include:* lifting equipment – jacks, ramps, lifts, axle stands
* air tools – air lines, tyre inflator/gauge, wrenches, hammers, blow guns
* bench tools – grindstone, pillar drill
* portable electric tools – hand drills, extension leads, component cleaners
* specialist tools – tracking gauges, filter removal straps, waste oil drainers, exhaust extraction
* select appropriate and necessary equipment for task

Discuss the types of checks that are required to maintain tools and equipment in a serviceable condition to include: * secure and on even ground
* leaks
* damage to pipes, cables or connections
* evidence of damage or abuse
* the equipment is appropriate for the task
* certification / 'tested' stickers are visible
* guards are in place
* service records are up to date
* stop / emergency cut off buttons or devices are working and within the operators reach
* tools are lubricated where necessary

Devise worksheets for learners to assess a range of tools and equipment for their condition and what appropriate action should be takenDemonstrate the safe use of a range of tools and equipment, learners to practice the safe use of tools and equipment under close supervision, include reference to: * using manufacturer’s instructions
* safe working procedures
* safe working limits
* specialist training requirements
* legal requirements
* reporting of defects
* adjust settings
* set pressure
* zero readings
* examine for defects
* locate correctly – axle stands and jacks
* use when appropriate – exhaust extraction when engine is running

Devise practical tasks that allow a learner to cover AC1.1-1.3: Select, check and safely use tools and equipment in the work environment, observe their practice and provide support and advice where appropriate. Devise question and answer activities, group work to check on their knowledge and understanding.  |
| Consumable materials used in vehicle maintenance and repair | 2.1-2.3 | Present and discuss, the range and purpose of consumable materials used in vehicle maintenance and repair to include:* lubricants
* coolants
* fluids
* adhesives and cements
* sealers
* filters
* aerosol sprays
* gaskets
* cleaners

Explain the importance of locating and accessing product information to include: * product manufacturers websites
* manufacturers' representatives
* manufacturers' online training videos
* technical helplines
* promotional brochures
* product catalogues
* trade shows
* product demonstrations

Highlight using the product information supports the safe use, include: * access and use of product safety information
* the purpose and limitations of the materials and consumables
* how to prepare the materials and consumables
* the safe use of the materials and consumables
* tools and techniques for safe use
* the clean-up processes
* waste disposal procedures

Devise practical tasks that allow a learner to bring together AC1.1-Select, check and safely use: tools, equipment and consumable materials in the work environment.Observe learner practice and provide support and advice where appropriate.Devise question and answer activities, group work to check on their knowledge and understanding. |
| Complete Learner Worksheet | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 21 hrs**  |

|  |  |
| --- | --- |
| UNIT REF: L1MV15 | **UNIT TITLE: HEALTH AND SAFETY PRACTICES IN A VALETING AND DETAILING ENVIRONMENT** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 13 Hrs**  |
| **Overview:**  This unit further develops the learner’s awareness of Health and Safety in the workplace by putting into practice the knowledge gained from unit L1MV01. Learners will further develop the knowledge in identifying hazards and risks, and be able to: demonstrate safe working practices using a variety of tools, equipment and consumable materials whilst carrying out vehicle valeting and detailing tasks |
| **Learning Outcomes:** |
| 1. **Know the hazards and risks associated with working in a valeting and detailing environment.**
2. **Know how to work safely in the valeting and detailing environment**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Hazards and risks associated with working in a valeting and detailing environment | 1.1-1.3  | Present and discuss with learners the hazards and associated risks when working in a valeting and detailing environment, to include: * slip and trip hazards, hazardous substances, electric shock, poor ventilation, battery charging, falling objects, movement of heavy loads

Hazards and risks associated with cleaners to include: * flammable liquids, skin irritation, chemical burns, swallowing fluids, fluid in eyes, fire hazards

Present and discuss the reasons for Health and Safety information found on cleaning and lubrication products.* on packaging of chemicals
* manufactures websites
* notices issued by local authority’s
* health and Safety Executive Web site (HSE)
* risk assessments

Introduce learners to the HSE Web site and a range of products supplies to find legislation and information surrounding the storage and safe use of cleaning products. Devise questions and answer sheets for learners to complete and demonstrate their understanding, provide appropriate feedback where necessary. Present and discuss the good housekeeping routines associated with vehicle valeting and detailing to include: * keeping work area clean of debris
* floors cleaned
* chemicals stored correctly
* bins emptied
* correct disposal of waste material
* prompt disposal and storage of waste materials
* prompt cleaning of spillages
* regular cleaning of work area
* storage of tools and equipment
* correct storage of flammable liquids

Simulate a poorly maintained work environment covering subjects and topics in AC 1.1-1.3 with a range of hazards: have learners complete a devised hazard and risk identification task sheet to check their understanding and knowledge. Discuss with the group their findings and provide appropriate feedback to further develop the group’s knowledge.  |
| Working safely in the valeting and detailing environment. | 2.1-2.2 | Present and discuss the appropriate selection of PPE and VPE for a range of valeting and detailing activities, include: * overalls
* safety boots
* skin protection
* eye protection
* ear protection
* dust mask
* seat covers
* steering wheel protectors
* wing covers
* floor mats

Devise questions and answer activities, group work and use of ILT to check on learner’s knowledge and understanding. Present and discuss the safe working practices to be used in the workplace.Having learners complete a risk assessment prior to an activity would be a good source of checking their current knowledge. Use of appropriate video clips to identifying good and poor working practice in the work environment will help to check learner’s knowledge and assist them being able to identify good and bad practice, and what to do as a result. Include: * use of PPE and VPE
* location of fire extinguishers
* following safety instructions
* correct use of tools and equipment

Including tools and equipment:* electrical equipment – blown fuses, damaged cables
* identifying unsafe hand tools - damaged hand tools
* identifying unsafe equipment – broken / missing components
 |
| Complete Learner Worksheet | 1.1-5.2 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 18 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV16 | **UNIT TITLE: TOOLS, EQUIPMENT AND CONSUMABLE MATERIALS USED FOR VALETING AND DETAILING** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 15 Hrs**  |
| **Overview:** This unit will provide learners with the knowledge and skills to be able to select, check and use tools and equipment used for valeting and detailing, the unit also covers the appropriate selection and use of consumable materials used valeting and detailing activities. |
| **Learning Outcomes:** |
| 1. **Know a range of tools and equipment used in valeting and detailing**
2. **Know a range of consumable materials used in valeting and detailing.**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Tools and equipment used in valeting and detailing | 1.1-1.3 | Present and discuss, the range and purpose of tools and equipment used in valeting and detailing to include:Tools and equipment:* water hose (mains pressure)
* cleaning brushes for paintwork
* wheel brushes or scrubbers
* sponges and buckets
* chamois leather
* polishing cloth
* pressure washer
* air lines and tools – blow guns
* portable electric tools – vacuum cleaners, machine polishers, extension leads, component cleaner
* select appropriate and necessary equipment for task
* steps and ladders

Discuss the types of checks that are required to maintain tools and equipment in a serviceable condition to include: * secure and on even ground
* leaks
* damage to pipes, cables or connections
* evidence of damage or abuse
* the equipment is appropriate for the task
* certification / 'tested' stickers are visible
* guards are in place
* service records are up to date
* stop / emergency cut off buttons or devices are working and within the operators reach

Devise worksheets for learners to assess a range of tools and equipment for their condition and what appropriate action should be takenDemonstrate the safe use of tools and equipment, learners to practice the safe use of tools and equipment under close supervision, include reference to: * using manufacturer’s instructions
* safe working procedures
* safe working limits
* specialist training requirements
* legal requirements
* reporting of defects

Devise practical tasks that allow a learner to cover AC1.1-1.3: Select, check and safely use tools and equipment in the work environment, observe their practice and provide support and advice where appropriate. Devise question and answer activities, group work to check on their knowledge and understanding.  |

|  |  |  |
| --- | --- | --- |
| Consumable materials used in valeting and detailing | 2.1-2.3 | Present and discuss, the range and purpose of consumable materials used in valeting and detailing to include:* shampoo
* polish
* tyre blackener
* glass cleaner
* tar remover
* chrome cleaner
* alloy wheel cleaner
* upholstery cleaner
* shampoo
* glass cleaner
* dashboard cleaner
* carpet shampoo

Explain the importance of locating and accessing product information to include: * product manufacturers websites
* manufacturers' representatives
* manufacturers' online training videos
* technical helplines
* promotional brochures
* product catalogues
* trade shows
* product demonstrations

Highlight using the product information supports the safe use, include: * access and use of product safety information
* the purpose and limitations of the materials and consumables
* how to prepare the materials and consumables
* the safe use of the materials and consumables
* tools and techniques for safe use
* the clean-up processes
* waste disposal procedures

Devise practical tasks that allow a learner to bring together AC1.1-2.3: Select, check and safely use: tools, equipment and consumable materials in the work environment.Observe learner practice and provide support and advice where appropriate.Devise question and answer activities, group work to check on their knowledge and understanding. |
| Complete Learner Worksheet | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 21 hrs**  |

|  |  |
| --- | --- |
| UNIT REF: L1MV17 | **UNIT TITLE: HEALTH AND SAFETY PRACTICES IN A CYCLE REPAIR ENVIRONMENT** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 13 Hrs**  |
| **Overview:** This unit further develops the learner’s awareness of Health and Safety in the workplace by putting into practice the knowledge gained from unit L1MV01. Learners will further develop the knowledge in identifying hazards and risks, and be able to: demonstrate safe working practices using a variety of tools, equipment and consumable materials whilst carrying out routine maintenance and simple repair tasks in a cycle environment. |
| **Learning Outcomes:** |
| 1. **Know the hazards and risks associated with working in the cycle environment.**
2. **Know how to work safely in the cycle environment.**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Hazards and risks associated with working in the cycle environment. | 1.1-1.3  | Present and discuss with learners the hazards and associated risks when working in a maintenance and repair environment, to include: * slip and trip hazards, hazardous substances, electric shock, explosion of tyres, poor ventilation, battery charging, falling objects, movement of heavy loads, overloading equipment

Hazards and risks associated with cleaners and lubricants to include: * flammable liquids, skin irritation, chemical burns, swallowing fluids, fluid in eyes, fire hazards

Present and discuss the reasons for Health and Safety information found on cleaning and lubrication products.* on packaging of chemicals
* manufactures websites
* notices issued by local authority’s
* health and Safety Executive Web site (HSE)
* risk assessments

Introduce learners to the HSE Web site and a range of products supplies to find legislation and information surrounding the storage and safe use of cleaning and lubrication products. Devise questions and answer sheets for learners to complete and demonstrate their understanding, provide appropriate feedback where necessary. Present and discuss the good housekeeping routines associated with cycle maintenance and repair to include: * keeping work area clean of debris
* floors cleaned
* chemicals stored correctly
* bins emptied
* correct disposal of waste material
* prompt disposal and storage of waste materials
* prompt cleaning of spillages
* regular cleaning of work area
* storage of tools and equipment
* correct storage of flammable liquids

Simulate a poorly maintained work environment covering subjects and topics in AC 1.1-1.3 with a range of hazards: have learners complete a devised hazard and risk identification task sheet to check their understanding and knowledge. Discuss with the group their findings and provide appropriate feedback to further develop the group’s knowledge.  |
| Working safely in the cycle environment. | 2.1-2.2 | Present and discuss the appropriate selection of PPE and VPE for a range of maintenance and repair activities, include: * overalls
* safety boots
* skin protection
* eye protection
* ear protection
* dust mask

Devise questions and answer activities, group work and use of ILT to check on learner’s knowledge and understanding. Present and discuss the safe working practices to be used in the workplace.Having learners complete a risk assessment prior to an activity would be a good source of checking their current knowledge. Use of appropriate video clips to identifying good and poor working practice in the work environment will help to check learner’s knowledge and assist them being able to identify good and bad practice, and what to do as a result. Include: * use of PPE and VPE
* use of stands and cycle supporting aids
* location of fire extinguishers
* following safety instructions
* correct use of tools and equipment

Including tools and equipment:* electrical equipment – blown fuses, damaged cables
* identifying unsafe hand tools - damaged hand tools
* identifying unsafe equipment – broken / missing components
 |
| Complete Learner Worksheet | 1.1-5.2 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 18 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV18 | **UNIT TITLE: TOOLS, EQUIPMENT AND CONSUMABLE MATERIALS USED FOR CYCLE MAINTENANCE AND REPAIR** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 15 Hrs**  |
| **Overview:** This unit will provide learners with the knowledge and skills to be able to select, check and use tools and equipment used for cycle maintenance and repairs, the unit also covers the appropriate selection and use of consumable materials used during maintenance and repair activities. |
| **Learning Outcomes:** |
| 1. **Know a range of tools and equipment used in cycle maintenance and repair**
2. **Know a range of consumable materials used in cycle maintenance and repair.**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Tools and equipment used in cycle maintenance and repair | 1.1-1.3 | Present and discuss, the range and purpose of tools and equipment used in cycle maintenance and repair to include:Hand tools:* tyre levers
* chain splitter
* bottom bracket wrench
* free wheel remover
* cassette lock ring tool
* sprocket removal tool
* cable oilers
* spoke keys
* spanners – open end, ring, combination
* screwdrivers – flat blade, Phillips, Pozidrive
* hammers – ball peen, copper/hide, rubber, neoprene
* saws – hacksaw, junior hacksaw
* allen keys
* pliers and grips – long nose, engineers, side snips/cutters, pipe grips, mole grips
* torque wrench
* drill

Equipment to include:* lifting equipment – stands
* air lines and tools – tyre inflator/gauge, blow guns
* bench tools – vices, grindstone, pillar drill
* portable electric tools – hand drills, extension leads, component cleaner
* select appropriate and necessary equipment for task

Discuss the types of checks that are required to maintain tools and equipment in a serviceable condition to include: * secure and on even ground
* leaks
* damage to pipes, cables or connections
* evidence of damage or abuse
* the equipment is appropriate for the task
* certification / 'tested' stickers are visible
* guards are in place
* service records are up to date
* stop / emergency cut off buttons or devices are working and within the operators reach
* tools are lubricated where necessary

Devise worksheets for learners to assess a range of tools and equipment for their condition and what appropriate action should be takenDemonstrate the safe use of a range of tools and equipment, learners to practice the safe use of tools and equipment under close supervision, include reference to: * using manufacturer’s instructions
* safe working procedures
* safe working limits
* specialist training requirements
* legal requirements
* reporting of defects

Devise practical tasks that allow a learner to cover AC1.1-1.3: Select, check and safely use tools and equipment in the work environment, observe their practice and provide support and advice where appropriate. Devise question and answer activities, group work to check on their knowledge and understanding.  |
| Consumable materials used in cycle maintenance and repair | 2.1-2.3 | Present and discuss, the range and purpose of consumable materials used in cycle maintenance and repair to include:* lubricants
* brake fluids
* puncture repair kits
* puncture preventative products
* cleaning and valeting products

Explain the importance of locating and accessing product information to include: * product manufacturers websites
* manufacturers' representatives
* manufacturers' online training videos
* technical helplines
* promotional brochures
* product catalogues
* trade shows
* product demonstrations

Highlight using the product information supports the safe use, include: * access and use of product safety information
* the purpose and limitations of the materials and consumables
* how to prepare the materials and consumables
* the safe use of the materials and consumables
* tools and techniques for safe use
* the clean-up processes
* waste disposal procedures

Devise practical tasks that allow a learner to bring together AC1.1-2.3: Select, check and safely use: tools, equipment and consumable materials in the work environment.Observe learner practice and provide support and advice where appropriate.Devise question and answer activities, group work to check on their knowledge and understanding. |
| Complete Learner Worksheet | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 20 hrs**  |

|  |  |
| --- | --- |
| UNIT REF: L1MV20 | **UNIT TITLE: COMPRESSION IGNITION ENGINE SYSTEM COMPONENTS AND OPERATION** |

|  |  |
| --- | --- |
| **Level: Level 1** | **Guided Learning (GL): 22 Hrs** |
| **Overview:** This unit introduces learners to the principles of CI engine systems, components and operation and includes the requirements for carrying out routine engine maintenance. |
| **Learning Outcomes:** |
| **2. Know CI engine systems and components****3. Understand how CI engines operate** |
| **Subject** | **AC** | **Teaching Methods** |
| Compression Ignition Engine Systems And Components | 2.1-2.3 | Present and discuss compression ignition 4 stroke internal combustion cycle. Use animations/videos to show the sequences.Introduce learners to suitable Web sites to support learning and understanding.Learners may also benefit from a demonstration with a sectioned compression ignition 4-stroke engine, so that they can track each stage of the process to gain understanding.Use group work activity to promote interactivity between groups, facilitate learning.Use devised work sheets for learners to complete to check their understanding and knowledge.Devise questions and answers activities, group work, and use of ILT. |
| Operation of Compression Ignition Engines | 3.1-3.4 | Present and identify compression ignition engine system operation through, presentations, use of video`s and demonstrations. Practical demonstration using opacity analyser, compare petrol with diesel emissions- constituents of exhaust gas and effects on the environmentDevise questions and answers activities, group work, and use of ILT. |
| Complete Learner Worksheet | 1.1-4.2 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 30 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV21 | **UNIT TITLE: AIR AND LIQUID COOLING SYSTEM COMPONENTS AND OPERATION** |

|  |  |
| --- | --- |
| **Level: Level 1** | **Guided Learning (GL): 15 Hrs** |
| **Overview:** This unit introduces learners to the principles of engine liquid cooling and air-cooling components and operation. It covers identifying the main components used in liquid cooling and air- cooling systems and the purpose and function of these components. The learner also has to carry out practical activities of removing and refitting liquid cooling system components and testing it for leaks.  |
| **Learning Outcomes:** |
| 1. **Know about engine liquid cooling and air-cooled systems**
2. **Know how engine cooling systems operate**

**4. Know about environmental considerations when disposing of waste materials** |
| **Subject** | **AC** | **Teaching and Learning Methods** |
| Engine liquid cooling and air-cooled systems | 1.1-1.2 | Present and discuss the purpose of the engine cooling system components: both liquid and air cooled systems, include: * coolant – water and antifreeze mixture
* radiator and radiator cap
* thermostat
* expansion tank
* pipes and hoses
* gaskets and sealing rings
* water pump and drive belt
* cooling fan – mechanical and electric
* vehicle heater

Introduce a range of components through, presentations, handling of components, use of video`s and demonstrations on vehicles.Devise questions and answers activities, group work, and use of ILT where appropriate. |
| Operation of Engines Cooling System | 2.1 | Explain the operating principles of:* conduction, convection and radiation principles
* thermo-siphon principle
* pressurised systems
* radiator
* radiator pressure cap
* expansion tank
* thermostat
* mechanical and electric fans
* fan
* heat exchangers
* air flow ducting
* cooling fins

Use presentations, video`s and demonstrations of components to demonstrate the concepts of operation. Devise questions and answers activities, group work, and use of ILT to check on learners understanding and knowledge.Provide support and feedback where necessary.  |
| Environmental considerations when disposing of waste materials  | 4.1 | Identify legal and organisational responsibilities and safe disposal practices regarding contaminated material and coolant.Observe safe disposal of contaminated material and coolant, question learners knowledge and understanding on processes and procedures |
| Complete Learner Worksheet | 1.1-5.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 20 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV22 | **UNIT TITLE: LUBRICATION SYSTEM COMPONENTS AND OPERATION** |

|  |  |
| --- | --- |
| **Level: Level 1** | **Guided Learning (GL): 15 Hrs** |
| **Overview:** This unit introduces learners to the principles of engine lubrication systems, components and operation. It covers identifying the main components used in lubrication systems and the purpose and function of these components. The learner also has to carry out practical activities of removing and refitting lubrication system components. |
| **Learning Outcomes:** |
| 1. **Know about engine lubrication systems**
2. **Know how engine lubrication systems operate**

**4. Know the environmental considerations when disposing of waste materials** |
| **Subject** | **AC** | **Teaching and Learning Methods** |
| Components Used In Engine Lubrication Systems | 1.1-1.2 | Present and discuss the purpose of the engine lubrication system components, include:* lubricants – purpose and function: cooling, reduce friction, remove by-products, reduce corrosion
* lubricant types: composition, natural & synthetic, grades, viscosity, properties
* engine sump
* oil pump and strainer
* pressure relief valve
* oil filter
* oil galleries

Introduce a range of components through, presentations, handling of components, use of video`s and demonstrations on vehicles.Devise questions and answers activities, group work, and use of ILT where appropriate. |
| Operation of Engine Lubrication System | 2.1 | Explain the operating principles of:* spray, splash, pressurised lubrication
* boundary lubrication
* sump
* oil pump
* oil filter
* oil pressure relief valve
* pressure monitoring (warning light, gauge)

Use presentations, video`s and demonstrations of components to demonstrate the concepts of operation. Devise questions and answers activities, group work, and use of ILT to check on learners understanding and knowledge.Provide support and feedback where necessary. |
| Environmental considerations when disposing of waste materials  | 4.1 | Identify legal and organisational responsibilities and safe storage and disposal practices regarding contaminated material and oils.Observe safe disposal of contaminated material and oils, question learners knowledge and understanding on processes and procedures |
| Complete Learner Worksheet | 1.1-5.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
|  **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 20 hrs** |

|  |  |
| --- | --- |
| UNIT REF: ELMV25 | **UNIT TITLE: INTRODUCTION TO COMPRESSION IGNITION FUEL SYSTEMS** |

|  |  |
| --- | --- |
| **Level: Entry 3** | **Guided learning (GL): 13 Hrs** |
| **Overview:** In this unit the learners will find out about the main components and the operating principles of vehicle fuel systems including routine maintenance procedures required for effective engine operation**.** |
| **Learning Outcomes:** |
| **2. Know the components of compression ignition fuel systems****4. Know how to dispose of fuel system components and fluids** |
| **Subject** | **AC** | **Teaching Methods** |
| Compression Ignition Fuel System Components | 2.1-2.2 | Discuss and identify the main components of a compression ignition fuel system. Use individual components ie injectors, pressure regulators, fuel pumps, to demonstrate their function and encourage learners to inspect the resources to become familiar. Use videos or presentations to enhance learning and facilitate understanding. Identify the layout of each fuel system component on a diesel engine vehicle.Use a prepared basic diagram of a fuel system to explain how the fuel is taken from the tank, to the engine and then burnt to produce kinetic energy. Use prepared laminated cards to allow each learner to identify fuel system components on a vehicle.Use a range of vehicles to compare the layout of components and differentiate between makes and models. Confirm learners’ understanding of component names and terminology with the use of Q&A. Prepare a simple quiz with questions on diesel fuel systems and include diagrams for the learner to label, and use this as underpinning knowledge. |
| Disposing of Fuel System Components and Fluids | 4.1 | Identify legal and organisational responsibilities and practices regarding safe disposal of contaminated filters and fuels.Observe safe disposal of contaminated filters and fuels, question learners knowledge and understanding on processes and procedures.Demonstrate links to HSE web site for current methods and legislation.  |
| Complete the learner worksheet | 1.1-4.1 | Provide supplementary materials and handouts.Explain the requirements and layout of the worksheet.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 18 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV26 | **UNIT TITLE: COMPRESSION IGNITION FUEL SYSTEM MAINTENANCE** |

|  |  |
| --- | --- |
| **Level: Level 1** | **Guided Learning(GL): 15 Hrs** |
| **Overview:** In this unit the learner will be introduced to the main components and the operating principles of a Compression Ignition (CI) fuel system. It covers identification of the main components used in the mechanical and hydraulic systems and include the routine maintenance procedures required for effective engine operation. |
| **Learning Outcomes:** |
| 1. **Know the components of compression ignition engine fuel systems**
2. **Know how compression ignition engine systems operate**
 |
| **Subject** | **AC** | **Teaching and Learning Methods** |
| Components of Compression Ignition Fuel Systems | 1.1-1.2 | Present and discuss: Identification and the purpose of compression ignition fuel system components, to include: * fuel tank
* fuel line
* fuel filter
* fuel pressurising system (high and low pressure)
* fuel metering & delivery system (common rail, injectors)
* air intake and filtration systems
* ECU

Use presentations, handling of components, use of video`s and demonstrations and vehicle inspections of the system.Devise handouts for learners which allow them to complete simple drawings of the layout of the fuel system and identify the location of the components.Use questions and answer activities to check on learner’s progress. Learners may also benefit from the use of group work and using of ILT to complete tasks. |
| Operation of compression ignition engine systems | 2.1 | Explain using video`s and component parts the operating principles of the fuel system components, to include: * direct/indirect and electronic injection systems
* high / low pressure circuits
* injection timing
* mixing of fuel and air
* Compression of air only
* Point of fuel injection (CI- near end of compression stroke, SI- on induction stroke)
* Benefits of pressure charging CI Engines compared to SI engines- less chance of detonation as no fuel during CI compression
* wider range of air/fuel ratios

Highlight exhaust emissions and environmental concerns to include:* environmental and health concerns for exhaust emissions

exhaust gas emissions – H2O, O, N, CO2, CO, HC, NOxUse interactive group work to enable learners to carryout investigations into the operating principles of the system components. Devise question and answer activities to check on learners knowledge and understanding, provide feedback where required to further learners knowledge.  |
| Awareness of Environmental Considerations | 4.1 | Identify legal and organisational responsibilities and practices regarding safe disposal of contaminated filters and fuels to include: * safe collection and storage of used components and liquids
* legal and local disposal methods

Observe safe storage and disposal of contaminated filters and fuels, question learners knowledge and understanding on processes and procedures. |
| Complete Learner Worksheet | 1.1-5.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 20 hrs** |

|  |  |
| --- | --- |
| UNIT REF: ELMV21 | **UNIT TITLE: VEHICLE DRIVELINE MAINTENANCE** |

|  |  |
| --- | --- |
| **Level: Entry 3** | **Guided Learning (GL): 17 Hrs** |
| **Overview: This unit introduces the learner to vehicle transmission systems and covers the basic identification of the major items of the unit and their function. It also allows the learner to use workshop manuals to locate specific data.** |
| **Learning Outcomes:** |
| **2. Know about vehicle drivelines****3. Know about vehicle gearboxes** |
| **Subject** | **AC** | **Teaching Methods** |
| Vehicle Drivelines | 2.1 | Study light vehicle drivelines and the component parts making up the drive chain. Use animations/videos and prepare PowerPoint presentations and interactive quizzes to enhance learning. Learners may also benefit from a demonstration with a sectioned gearbox or driveline components laid out as a resource, so that they can track each stage of the driveline process to gain understanding of the system and its operation.Explain the layout of vehicle driveline components using a demonstration vehicle on a ramp/lift so learners can access it, and ask learners to identify major components in a driveline along with stating a brief explanation of their function.  |
| Vehicle Gearboxes | 3.1 | Identify the main components found in basic manual and automatic gearboxes using sectioned gearboxes. Identify component positions using vehicles on lifts, ramps etc and ask learners to identify each component and briefly state their function.Use videos to show how energy from the engine is transmitted into motion using a gearbox. Confirm learner understanding with use of Q&A. |
| Complete the learner worksheet | 1.1-4.3 | Provide supplementary materials and handouts.Explain the requirements and layout of the worksheet.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 22 hrs** |

|  |  |
| --- | --- |
| UNIT REF: ELMV20 | **UNIT TITLE: ROUTINE VEHICLE MAINTENANCE PROCESSES AND PROCEDURES** |

|  |  |
| --- | --- |
| **Level: Entry 3** | **Guided Learning (GL): 17 Hrs** |
| **Overview:** This unit introduces learners to the principles of routine vehicle maintenance on vehicles with 4 wheels or more. It requires learners to know the tools and equipment that would be used during routine vehicle maintenance. It also covers the procedures and methods that must be used to ensure this is carried out effectively. The final outcome of the unit is concerned with the learner being able to safely and correctly carry out routine vehicle maintenance. |
| **Learning Outcomes:** |
| **2. Know vehicle components and systems that require routine maintenance****3. Know routine maintenance requirements for vehicle systems and components** |
| **Subject** | **AC** | **Teaching Methods** |
| Know vehicle components and systems that require routine maintenance | 2.1-2.2 | Identify the vehicle systems and components on a modern vehicle that require routine maintenance. Using a vehicle, demonstrate to the students each area that requires maintenance and explain each check. Introduce a logical approach to carrying out the checks using a check sheet within an acceptable time.Observe and question students on their knowledge of the systems and carrying out the checks. |
| Know routine maintenance requirements for vehicle systems and components | 3.1 | Have the students use appropriate data sources for different vehicles to identify the maintenance requirements of specific vehicles. From the data question students and ask them to select the range of tools and equipment that would be required to carry out vehicle maintenance. Observe students selecting appropriate tools and using them correctly. |
| Complete the learner worksheet | 1.1-3.1 | Provide supplementary materials and handouts.Explain the requirements and layout of the worksheet.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 22 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV27 | **UNIT TITLE: VEHICLE STEERING AND SUSPENSION SYSTEM COMPONENTS AND MAINTENANCE (4 WHEELS OR MORE)** |

|  |  |
| --- | --- |
| **Level: Level 1** | **Guided Learning (GL): 22 Hrs** |
| **Overview:** This unit introduces learners to the principles of vehicle steering and suspension system components and operation. It covers identifying the main components used in steering and suspension systems and the purpose and function of these components. It also requires the learner to remove and replace steering and suspension components. |
| **Learning Outcomes:** |
| 1. **Know about non-assisted and assisted steering and suspension components**
2. **Know how non-assisted and assisted steering and suspension systems operate**
 |
| **Subject** | **AC** | **Teaching and Learning Methods** |
| Components of Steering and Suspension Systems | 1.1-1.4 | Present and discuss: Identification of non-assisted and assisted steering systems to include:* steering wheel
* steering column
* steering joints and couplings
* steering gearbox – rack and pinion system and conventional steering box types
* manual and power steering
* drag link
* track rods
* steering arms
* track control arm
* track rod ends
* rubber gaitors
* swivel pin and front hub assembly

Purpose of steering components to include: * steering column – including impact absorbing and telescopic aspects
* steering joints and couplings
* steering gearbox – rack and pinion system and conventional steering box type
* function of drag link, track rods, steering arms, track control arm, track rod ends, rubber gaiters
* ball joints and front hub assembly
* manual and power steering (Pump, Fluid lines, Drive belts)

Use presentations, handling of components, use of video`s, demonstrations and vehicles inspections, devise and use vehicle inspection tasks to reinforce the topics covered. Devise questions and answers activities, group work, and use of ILT where appropriate. Present and discuss: Identification of the main suspension system components to include:* springing methods – metal, rubber, fluid, air
* spring types – leaf, coil, torsion bar, rubber, fluid, air
* suspension damper
* beam axle arrangement
* independent suspension
* Independent Suspension types – Macpherson strut, wishbone, trailing arm
* anti-roll bars

Purpose of suspension system components to include: * action of springs – leaf, coil, torsion bar
* function of suspension damper

Use presentations, handling of components, use of video`s, demonstrations and vehicles inspections, devise and use vehicle inspection tasks to reinforce the topics covered. Devise questions and answers activities, group work, and use of ILT where appropriate.  |
| Operating Principles of Steering and Suspension System Components | 2.1-2.2 | Identify steering and suspension system operation through, presentations, use of video`s and demonstrations to include: Steering: * Ackermann layout
* Camber
* Castor
* Swivel Axis Inclination (formerly KPI)
* front wheel alignment (toe)
* steering gearbox – rack and pinion system and conventional steering box types
* front hubs

Suspension: * IFS
* IRS
* beam axle arrangement – layout, disadvantages
* independent suspension – layouts, advantages
* action of suspension – Macpherson strut, wishbone, trailing arm, anti-roll bar
* bump and rebound (including methods of damping)

Devise questions and answers activities, group work, and use of ILT to reinforce the concepts of steering and suspension systems.  |
| Complete Learner Worksheet | 1.1-5.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 30 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV19 | **UNIT TITLE: SPARK IGNITION ENGINE SYSTEM COMPONENTS AND OPERATION** |

|  |  |
| --- | --- |
| **Level: Level 1** | **Guided Learning (GL): 22 Hrs** |
| **Overview:** This unit introduces learners to the principles of SI engine systems, components and operation and includes the requirements for carrying out routine engine maintenance |
| **Learning Outcomes:** |
| **2. Know SI engine systems and components****3. Understand how SI engines operate** |
| **Subject** | **AC** | **Teaching Methods** |
| Components of Spark Ignition Engine Systems | 2.1-2.3 | Present and discuss the spark ignition 4 stroke internal combustion cycle. Use animations/videos to show the sequences.Introduce learners to suitable Web sites to support learning and understanding.Learners may also benefit from a demonstration with a sectioned 4-stroke engine, so that they can track each stage of the process to gain understanding.Use group work activity to promote interactivity between groups, facilitate learning.Use devised work sheets for learners to complete to check their understanding and knowledge.Devise questions and answers activities, group work, and use of ILT. |
| Operation of Spark Ignition Engines | 3.1-3.4 | Present and identify spark ignition engine system operation through, presentations, use of video`s and demonstrations. Comparison between 2 & 4 stroke engines and 4 stroke valve operation using sectioned engines and video`s.Learners to complete handout on engine operation. Practical demonstration using gas analyser to identify constituents of exhaust gasDevise questions and answers activities, group work, and use of ILT. |
| Complete Learner Worksheet | 1.1-4.3 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 30 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV28 | **UNIT TITLE: LIGHT VEHICLE BRAKING SYSTEM COMPONENTS AND MAINTENANCE** |

|  |  |
| --- | --- |
| **Level: Level 1** | **Guided Learning (GL): 21 Hrs** |
| **Overview:** This unit introduces learners to the principles of vehicle braking system components and operation. It covers identifying the main components used in the mechanical and hydraulic braking systems and the purpose and function of these components. The learner also has to carryout practical routine maintenance on light vehicle braking systems. |
| **Learning Outcomes:** |
| 1. **Know non-ABS vehicle braking system components**
2. **Know how basic vehicle braking systems operate**

**4. Know about environmental considerations when disposing of waste materials** |
| **Subject** | **AC** | **Teaching and Learning Methods** |
| Components of Non-ABS Braking Systems | 1.1-1.2 | Present and discuss: Identification and purpose of the vehicles braking system to include:Mechanical components.* drum brakes – brake pedal, brake shoes, leading shoe, trailing shoe, adjusters, return springs, backing plate, parking brake mechanism
* disc brakes – front disc brake system, disc pads, brake calliper, brake disc, parking brake system

Hydraulic.* single and dual line layout
* master cylinders
* wheel cylinders
* disc brake caliper & pistons
* brake lines and flexible pipes
* brake servo
* requirements and hazards of brake fluid – boiling point, hygroscopic action, potential to damage paint surfaces
* manufacturer’s change periods for brake fluid

Use presentations, handling of components, use of video`s and demonstrations and vehicle inspections of the system.Devise and use handouts which allow learners to complete simple line diagrams of braking system layouts, the location of components. Devise questions and answers activities, group work, and use of ILT to check on learner’s progress of knowledge and understanding.  |
| Operation of Non-ABS Braking Systems | 2.1-2.2 | Braking system operation to include:Mechanical. * fundamental braking principles – converting kinetic energy to heat energy
* coefficient of friction – between tyres and road, between brake shoes and brake drum, brake pad and brake disc
* advantages / disadvantages of drum brakes and disc brakes
* action of drum brakes, leading and trailing brake shoes, self-servo action
* action of disc brakes, brake calliper, pad retraction
* terms associated with braking systems, braking efficiency, brake fade, brake balance, ABS

Non ABS hydraulic. * action of brake fluid – incompressible, equalising force, absorption of moisture, effect of air in system, requirement to change fluid, need to bleed system
* action of master cylinders and wheel cylinders, brake calliper’s, brake pad retraction, equalising valves
* action of brake servo
* split braking systems

Use presentations, video`s and demonstrations to illustrate the operation of the mechanical and hydraulic systems. Practical demonstrations of hydraulic operation and friction related theory. Use of a brake rolling road would be an advantage when introducing learners to the concepts of friction and brake efficiencies.Devise questions and answers activities, group work, and use of ILT to check on learners progress and knowledge.  |
| Awareness of Environmental Considerations | 4.1 | Identify legal and organisational responsibilities and practices regarding safe disposal of brake components and fluid.Observe safe disposal of contaminated materials, question learners knowledge and understanding on processes and procedures |
| Complete Learner Worksheet | 1.1-5.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time(TQT) : 30 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV29 | **UNIT TITLE: LIGHT VEHICLE WHEEL AND TYRE CONSTRUCTION AND MAINTENANCE** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 15 Hrs** |
| **Overview:** This unit introduces learners to light vehicle road wheels and tyres and their routine maintenance requirements. It includes identifying the construction of road wheels and tyres and the applications to different types of light vehicle. The learner also covers road wheel and tyre terminology, tyre markings, legal requirements and the will carry out the procedures for replacing standard tyres. |
| **Learning Outcomes:** |
| 1. **Know how wheel and tyres are constructed**
2. **Know wheel and tyre terminology**
 |
| **Subject** | **AC** | **Teaching and Learning Methods** |
| Construction of tyres and wheels | 1.1-1.3 | Present and discuss: Use visual aids to present and describe the common types of tyres used on light vehicles, to include:* radial ply tyre
* cross ply
* tube type tyres
* tubeless tyres

Tyre construction.* casing plies - the arrangement for cross ply and radial designs
* tyre tread – types and applications for car, motorcycle, truck, caravans, trailers, specialist vehicles, on-road and off-road tyres
* tread depth indicator
* tyre bead
* tread bracing
* tyre sidewall

Common types of light vehicle wheels.* alloy wheels
* pressed steel wheels
* space saver wheels
* split rim wheels

Use presentations, video`s and components to provide learners with the range of tyre and wheel types and their application and use.Devise questions and answer activities, group work and use of ILT where appropriate to reinforce subject and topics.  |
| Wheel and tyre terminology | 2.1 | Use visual aids to present and explain the common tyre markings found on tyres and wheels and their meaning to include:* tyre type marking
* tyre and wheel diameter
* tyre section width
* tread depth
* tyre aspect ratio
* speed rating
* load index

Devise activity sheet, discuss and facilitate learners gathering samples of wheel and tyre markings from a range of light vehicles.Devise questions and answer activities, group work and use of ILT where appropriate to reinforce subject and topics, use Q&A to check learners understanding.  |
| Complete Learner worksheet  | 1.1-5.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 20 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV31 | **UNIT TITLE: LIGHT VEHICLE EXHAUST SYSTEM COMPONENTS AND MAINTENANCE** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 15 Hours**  |
| **Overview:** This unit introduces learners to the fundamental principles of light vehicle exhaust systems. It requires learners to know how to work safely when removing and refitting exhaust systems and includes the identification of the main components |
| **Learning Outcomes:** |
| 1. **Know exhaust systems components**
2. **Know how exhaust systems operate**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Exhaust system components | 1.1-1.3 | Present and discuss: the identification and purpose of each component of the exhaust system to include:* Materials – steel, stainless steel
* exhaust manifold
* lambda sensor
* silencers and catalytic converter
* exhaust system brackets, joints and gaskets

Use visual aids to present and explain the purpose of each of the exhaust system components, use video links to manufacturers Web sites to reinforce the concepts of the system, include the different types of material used in exhaust system construction and the maintenance requirements. Highlight the sequences to be used in the removal and replacement of light vehicle exhaust systems to include:* PPE
* waiting for components to cool
* correct sequence for given light vehicle
* ventilation when engine running
* checking for leaks
* checking for correct alignment

Highlight the importance of checking for correct operation on replacement of the system to check components and to confirm functionality. |
| Operation of exhaust system components | 2.1 | Explain the basic operation of the exhaust system, including: exhaust noise reduction, reducing pollution levels to the environment, noise regulations and service and maintenance needs. Introduce learners to setting up and measuring the exhaust gasses emitted from an engine using an exhaust emission tester.Highlight the damage to the environment and the health of individuals from the toxic emissions and the legal requirements that manufacturers have to comply with.  |
| Complete Learner worksheet  | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 20 hrs** |

|  |  |
| --- | --- |
| UNIT REF: ELMV22 | **UNIT TITLE: SPARK IGNITION SYSTEM MAINTENANCE** |

|  |  |
| --- | --- |
| **Level: Entry 3** | **Guided learning (GL): 13 Hrs** |
| **Overview:** In this unit the learner will find out about the main components of vehicle ignition systems, their **construction and correct usage including the carrying out of practical activities regarding inspection and maintenance.** |
| **Learning Outcomes:** |
| **2. Know about vehicle ignition systems** |
| **Subject** | **AC** | **Teaching Methods** |
| Ignition System Components | 2.1-2.2 | Discuss and identify the main components of a distributor-less spark ignition system. Use individual components to demonstrate ignition system principles and allow learners to inspect them to become familiar. Explain the function of each component. Ask learners to correctly name components and briefly state their function. Use videos that illustrate a working ignition system/spark plug firing - or presentations to enhance learning and facilitate understanding. Identify the layout of each component within a vehicle engine compartment. Confirm learners’ understanding of component names and terminology with the use of Q&A or quizzes. |
| Complete the learner worksheet | 1.1-3.5 | Provide supplementary materials and handouts.Explain the requirements and layout of the worksheet.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 18 hrs** |

|  |  |
| --- | --- |
| UNIT REF: ELMV24 | **UNIT TITLE: INTRODUCTION TO SPARK IGNITION FUEL SYSTEMS** |

|  |  |
| --- | --- |
| **Level: Entry 3** | **Guided Learning (GL): 12 Hrs** |
| **Overview:** In this unit the learners will find out about the main components and the operating principles of vehicle fuel systems including routine maintenance procedures required for effective engine operation. |
| **Learning Outcomes:** |
| **2. Know the components of spark ignition fuel systems** |
| **Subject** | **AC** | **Teaching Methods** |
| Spark Ignition Fuel System Components | 2.1-2.2 | Discuss and identify the main components of a spark ignition fuel system.Use individual components to demonstrate their function and encourage learners to inspect the resources to become familiar. Ask learners to state the names and basic function if major components. Use videos or presentations to enhance learning and facilitate understanding. Identify the layout of each fuel system component by using a demonstration vehicle. Use a prepared basic diagram of a fuel system to explain how the fuel is taken from the tank, to the engine and then burnt to produce kinetic energy.Use prepared laminated cards to allow each learner to identify fuel system components on a vehicle.Use a range of vehicles to compare the layout of components and differentiate between makes and models. Confirm learners’ understanding of component names and terminology with the use of Q&A. Prepare a simple quiz with questions on fuel systems and include diagrams for the learner to label, and use this as underpinning knowledge. |
| Complete the learner worksheet | 1.1-4.2 | Provide supplementary materials and handouts.Explain the requirements and layout of the worksheet.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 16 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV34 | **UNIT TITLE: HEAVY VEHICLE WHEEL AND TYRE CONSTRUCTION AND MAINTENANCE** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 15 Hrs**  |
| **Overview:**  This unit introduces learners to road wheels and tyres and their routine maintenance requirements. It includes identifying the construction of road wheels and tyres and the applications to different types of vehicle. The unit also covers road wheel and tyre terminology, tyre markings, legal requirements and the procedures for replacing standard tyres. |
| **Learning Outcomes:** |
| 1. **Know how wheel and tyres are constructed**
2. **Know wheel and tyre terminology**
 |
| **Subject** | **AC** | **Teaching and Learning Methods** |
| Construction of tyres and wheels | 1.1-1.3 | Use visual aids to present and describe the common types of vehicle tyre in use on heavy vehicles, to include: tread pattern and uses, tubed and tubeless.Provide learners with a range of tyre samples to visually see the different typesPresent and describe the construction of radial and cross ply tyre construction.Learners to draw diagrams of the construction of both types.Explain the different types of construction of heavy vehicle tyres and materials used.Learners to provide sample answers as to the reasons why there are different types.  |
| Wheel and tyre terminology | 2.1 | Use visual aids to present and explain the common tyre markings found on tyres and wheels and their meaning.Devise activity sheet, discuss and facilitate learners gathering samples of wheel and tyre markings from a range of vehicles.Q&A to check learners understanding.  |
| Complete Learner worksheet  | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, tutorial, feedback and directed study time (TQT) 21 hrs**  |

|  |  |
| --- | --- |
| UNIT REF: L1MV35 | **UNIT TITLE: HEAVY VEHICLE EXHAUST SYSTEM COMPONENTS AND MAINTENANCE** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 15 Hrs** |
| **Overview:** This unit introduces learners to the fundamental principles of vehicle exhaust systems. It requires learners to know how to work safely when removing and refitting exhaust systems and includes the identification of the main components  |
| **Learning Outcomes:** |
| 1. **Know exhaust systems components**
2. **Know how exhaust systems operate**
 |
| **Subject** | **AC** | **Teaching and Learning Methods** |
| Exhaust system components | 1.1-1.2 | Present and discuss:The identification and purpose of heavy vehicle exhaust system components to include:* Materials – steel, stainless steel.
* exhaust manifold
* lambda sensor
* front pipe
* silencer box
* expansion box
* catalytic converter
* tail pipe
* exhaust system brackets, exhaust system joints and gaskets

Use visual aids to identify and explain the purpose of each of the exhaust system components above.Use video links to manufacturers Web sites to introduce learners to the large range of manufacturers making exhaust system components including upgrade systems. Reinforce the concepts of the system, include the different types of material used in exhaust system construction and the maintenance requirements.  |
| Operation of exhaust system components | 2.1 | Present and discuss the operating principles of: * Noise reduction
* Reduce engine exhaust emissions
* Noise regulations
* Service needs

Introduce learners to the legal requirements that manufacturers need to meet to comply with current exhaust emission legislation.Demonstrate the setup and use of an exhaust gas analyser on measuring a vehicles exhaust emissions. Devise questions and answer activities, group work and use handouts for learners which require them to identify parts of the system and state the purpose of the components.  |
| Complete Learner worksheet  | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT) : 21 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV36 | **UNIT TITLE: HEAVY VEHICLE BRAKING SYSTEM COMPONENTS AND MAINTENANCE** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 23 Hrs**  |
| **Overview:** This unit introduces learners to the principles of heavy vehicle braking systems, components and operation. It covers identifying the main components used in the mechanical, hydraulic and air braking systems and the purpose and function of these components. The learner also has to carry out practical routine maintenance on heavy vehicle braking systems. |
| **Learning Outcomes:** |
| **1. Know heavy vehicle braking system components****2. Know how basic heavy vehicle braking systems operate****4. Be able to** **clean the work area and leave in a safe condition.** |
| **Subject** | **AC** | **Teaching and Learning Methods** |
| Heavy vehicle braking system components | 1.1-1.3 | Present and discuss: The identification and purpose of heavy vehicle braking system components to include:Mechanical. * drum brakes – brake pedal, brake shoes, leading shoe, trailing shoe, adjusters, return springs, backing plate, parking brake mechanism
* disc brakes – front disc brake system, disc pads, brake calliper, brake disc

Hydraulic. * single and dual line layout, master cylinders, wheel cylinders, disc brake caliper & pistons, brake lines and flexible pipes

Air components. * dual line systems, foot brake valve, compressor, brake pressure regulators, brake air dryers, multi circuit protection valve, relay valve, air dump valve, load sensing valves, warning signals

Use visual aids to present and explain an overview of the basic components of mechanical, hydraulic and air braking system. Use workshop activity and the devised worksheets for learners to complete on the identification of the main heavy braking system components. Devise question and answer activities, group work and ILT to check on learners progress.  |
| Basic operation of heavy braking system components | 2.1-2.3 | Explain the operating principles to include: * fundamental braking principles – converting kinetic energy to heat energy
* coefficient of friction – between tyres and road, between brake shoes and brake drum, brake pad and brake disc
* advantages of drum brakes and disc brakes
* action of drum brakes, leading and trailing brake shoes, self-servo action
* action of disc brakes, brake calliper, pad retraction
* terms associated with braking systems, braking efficiency, brake fade, brake balance

Hydraulic.* action of brake fluid – incompressible, equalising force, absorption of moisture, effect of air in system, requirement to change fluid, need to bleed system
* action of master cylinders and wheel cylinders, brake callipers, brake pad retraction
* split braking systems

Air system.* advantages of air brakes, compression and storage, system control, system actuation

Use video links to manufacturers and Web sites to reinforce the mechanical, hydraulic and air system concepts for the braking system, their interdependency of each system, include the basic maintenance requirements and service needs of each of the braking systems.Explain the legal requirements for daily driver checks and recording of vehicle maintenance schedules for operators, introduce learners to the DVSA Web site for detailed information. Use Q&A and quizzes to check on learners knowledge and understanding and facilitate the quiz, use of group work where appropriate.  |
| Complete Learner worksheet  | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT) : 31 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV38 | **UNIT TITLE: MOTORCYCLE STEERING AND SUSPENSION SYSTEM COMPONENTS AND MAINTENANCE** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided learning (GL):19 Hrs**  |
| **Overview:**  This unit introduces learners to the principles of motorcycle steering and suspension systems, components and operation. It covers identifying the main components used in steering and suspension systems and the purpose and function of these components. It also requires the learner to remove and replace steering and suspension components. |
| **Learning Outcomes:** |
| 1. **Know how steering and suspension systems are constructed**
2. **Know how steering and suspension systems operate**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Construction of steering and suspension systems  | 1.1-1.4 | Present and discuss, identification and the purpose of:Conventional steering system, to include: * Handlebars
* handlebar clamps
* steering yokes- triple clamps
* steering damper
* steering head bearings- ball and taper roller
* forks
* wheel spindle and wheels bearings

Suspension system identification.* single & twin rear shock
* swing arm
* telescopic front forks
* leading link
* trailing link

Purpose of the suspension: * coil springs
* hydraulic dampers
* trailing arms
* swing arm
* telescopic forks
* bump stops

Present and explain the reasons why motorcycles require steering and suspension systems. Use visual aids to provide a basic overview of the different types and the purpose of the components used in these systems.Visit workshop and learners to complete devised activity sheet to identify a range of steering and suspension systems used on various motorcycles, street, scooter, and motocross and road racer.Highlight the needs for each type of motorcycle application, use Web videos to reinforce the different needs. Use Q&A to check progress on learners knowledge and understanding.  |

|  |  |  |
| --- | --- | --- |
| Operation of steering and suspension systems | 2.1-2.2 | Explain the operating principles to include:Steering.* provide the rider with control of motorcycle direction
* allow the rider to change direction easily
* isolate rider from road shocks
* light in its construction

Suspension. * support the mass of the motorcycle
* provide the rider with a smooth ride
* action of suspension – front forks, rear suspension
* bump and rebound (including methods of damping)
* ride heights and adjustments

Use Web video`s and visual aids to help explain the operation of steering and suspension systems.Devise questions and answer activities, group work, and use of ILT to check on learners understanding and knowledge.Provide support and feedback to reinforce learners knowledge where appropriate.  |
| Complete Learner Worksheet | 1.1-5.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 26 hrs**  |

|  |  |
| --- | --- |
| UNIT REF: L1MV39 | **UNIT TITLE: MOTORCYCLE BRAKING SYSTEM COMPONENTS AND MAINTENANCE** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided learning (GL): 15 hrs**  |
| **Overview:** This unit introduces learners to the principles of motorcycle braking systems, components and operation. It covers identifying the main components used in the mechanical and hydraulic systems and the purpose and function of these components. The learner also has to carry out practical routine maintenance on motorcycle braking systems |
| **Learning Outcomes:** |
| 1. **Know motorcycle braking system components**
2. **Know how basic motorcycle braking systems operate**
 |
| **Subject** | **AC** | **Teaching and Learning Methods** |
| Motorcycle braking system components | 1.1-1.2 | Present and discuss the identification and purpose of motorcycle braking system components to include:Mechanical.* drum brakes – brake pedal and lever brake shoes, leading shoe, trailing shoe, adjusters, return springs, backing plate
* disc brakes – front and rear disc brake system, disc pads, brake calliper, brake disc

Hydraulic.* single line layout, master cylinder, disc brake caliper & pistons, brake lines and flexible pipes, brake fluid

Introduce learners to components through, visual aids and video`s to present and explain an overview of the basic components of mechanical and hydraulic braking system. Use workshop activity and the devised worksheets for learners to complete on the identification of the main motorcycle braking system components. Devise questions and answer activities, group work and use of ILT where appropriate to check on learners knowledge and understanding, provide support where required.  |
| Basic operation of motorcycle braking system components | 2.1-2.2 | Explain the operating principles of mechanical and hydraulic systems to include:Mechanical.* fundamental braking principles – converting kinetic energy to heat energy
* coefficient of friction – between tyres and road, between brake shoes and brake drum, brake pad and brake disc
* advantages of drum brakes and disc brakes
* action of drum brakes, leading and trailing brake shoes, self - servo action
* action of disc brakes, brake calliper, pad retraction
* terms associated with braking systems, braking efficiency, brake fade, brake balance

Hydraulic.* action of brake fluid – incompressible, equalising force, absorption of moisture, effect of air in system, requirement to change fluid, need to bleed system
* action of master cylinders, brake callipers, brake pad retraction

Use video links to manufacturers and Web sites to reinforce the mechanical and hydraulic system concepts for the braking system, their interdependency of each system.Include the basic maintenance requirements and service needs of each of the braking system to include: wear indicators, fluid changes and adjustments.Introduce learners to reasons for weighing the motorcycle, completing a brake rolling road test and calculations of brake efficiencies. Use Q&A and quizzes to check on learner’s knowledge and understanding and facilitate the quiz, use of group work where appropriate.  |
| Clean the work area and leave in a safe condition | 4.1 | Identify good housekeeping routines used for cleaning and correct storage of tools and equipment.Identify legal and organisational requirements for the work area to be left in a safe condition and meeting safe waste disposal requirements.Observe learners compliance to and provide feedback regarding their working practices for this unit.  |
| Complete Learner worksheet  | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 21 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV40 | **UNIT TITLE: ROUTINE MOTORCYCLE MAINTENANCE AND SERVICE ADJUSTMENT PROCESSES** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided learning (GL): 18 Hrs**  |
| **Overview:**  This unit introduces learners to the principles of routine motorcycle maintenance. It requires learners to know the tools and equipment that would be used during routine motorcycle maintenance. It also covers the procedures and methods that must be used to ensure this is carried out effectively. The final outcome of the unit is concerned with the learner being able to safely and correctly carryout routine motorcycle maintenance |
| **Learning Outcomes:** |
| 1. **Know motorcycle components and systems that require routine maintenance**
2. **Know routine maintenance requirements for motorcycle systems and components**
 |
| **Subject** | **AC** | **Teaching and Learning Methods** |
| Components that require routine maintenance  | 1.1 | Present and explain: the reasons why motorcycles require routine maintenance and service adjustment, to include:* Tyres – wear and condition, wheels – damage, buckling
* Brakes – wear, adjustment, fluid leaks, fluid level, corrosion of pipes, condition of hoses
* Steering and suspension – wheel alignment, security of components, wear of bearings, suspension damper
* Electrical – battery, charging system, warning lamps, horn
* Lighting – function of side and rear lamps, number plate lamp, headlamps, dip and main beam control, indicators, hazard lamps, rear fog lamps
* Fluid checks – brake fluid level and condition, coolant leaks and level, oil leaks and level, battery
* Transmission – clutch operation and adjustment, tensions, drive shafts, joints, rubber boots, fluid leaks
* Motorcycle bodywork - paintwork, seat, wing mirror condition, security of components and panels
* Rider controls – brake, clutch and throttle operation and adjustment, warning lamps, switch operation, centre and side stand, steering stops
* Component security – frame attachments, fasteners for main suspension, steering and braking systems

Use appropriate information sources to obtain and highlight individual maintenance needs for given motorcycles, explain the different types of service schedules and variances due to mileage and motorcycle use conditions.Highlight the information provided by the information source: pressures, capacities and settings. Use group work with learners to access motorcycle maintenance schedules in preparation for carrying out the practical activity.Learners to produce plans for a motorcycle service which highlights:* Parts and lubricant’s required
* Tools and equipment required
* Type of service schedule to be carried out
* Technical information highlighting the service adjustments required
 |
| Locating and using: information, tools and equipment | 2.1 | Present and discuss the types of information sources, tools and equipment available to the technician to assist with carrying out motorcycle maintenance and adjustments, to include:* Motorcycle specifications and data, motorcycle manufacturer’s inspection requirements, motorcycle manuals, motorcycle inspection check lists, motorcycle lift and stands, wheel alignment, spanners and sockets, torque wrench, carburettor balance equipment, screwdrivers, levers and bars, inspection lamps, tyre tread depth indicator, measurement tools

Use visual aids, images and technical data to present and describe the practical routines a motorcycle requires to carry out the various maintenance activities to motorcycle systems.Demonstrate the use of typical tools, equipment, consumables, lubricants and fluids to ensure maintenance routines are carried out as per manufacturer’s instructions.Highlight the use of technical specifications for quantities, pressures, settings, fluid types and capacities. Include appropriate Health and safety relating to carrying out motorcycle maintenance and service adjustments.  |
| Complete Learner Worksheet | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time(TQT): 24 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV41 | **UNIT TITLE: MOTORCYCLE WHEEL AND TYRE CONSTRUCTION AND MAINTENANCE** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 16 Hrs** |
| **Overview:** This unit introduces learners to road wheels and tyres and their routine maintenance requirements. It includes identifying the construction of road wheels and tyres and the applications to different types of motorcycle. The unit also covers road wheel and tyre terminology, tyre markings, legal requirements and the procedures for replacing standard tyres. |
| **Learning Outcomes:** |
| 1. **Know how wheel and tyres are constructed**
2. **Know wheel and tyre terminology**
 |
| **Subject** | **AC** | **Teaching and Learning Methods** |
| Construction of tyres and wheels | 1.1-1.3 | Present and discuss: Use visual aids to present and describe the common types of tyres used on motorcycles, to include:* radial ply tyre
* bias ply
* tube type tyres
* tubeless tyres

Tyre construction.* casing plies - the arrangement for bias ply and radial designs
* tyre tread – types and applications for: road, custom, on-road and off-road tyres
* tread depth indicator
* tyre bead
* tread bracing
* tyre sidewall

Common types of motorcycle wheels.* alloy wheels
* carbon fibre wheels
* pressed steel wheels
* spoked wheels

Use presentations, video`s and components to provide learners with the range of tyre and wheel types and their application and use.Devise questions and answer activities, group work and use of ILT where appropriate to reinforce subject and topics.  |
| Wheel and tyre terminology | 2.1 | Use visual aids to present and explain the common tyre markings found on tyres and wheels and their meaning to include:* tyre type marking
* tyre and wheel diameter
* tyre section width
* tread depth
* tyre aspect ratio
* speed rating
* load index

Devise activity sheet, discuss and facilitate learners gathering samples of wheel and tyre markings from a range of motorcycles.Devise questions and answer activities, group work and use of ILT where appropriate to reinforce subject and topics, use Q&A to check learners understanding.  |
| Complete Learner worksheet  | 1.1-5.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 21 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV42 | **UNIT TITLE: MOTORCYCLE EXHAUST SYSTEM COMPONENTS AND MAINTENANCE** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 16 Hrs**  |
| **Overview:** This unit introduces learners to the fundamental principles of motorcycle exhaust systems. It requires learners to know how to work safely when removing and refitting exhaust systems and includes the identification of the main components |
| **Learning Outcomes:** |
| 1. **Know exhaust systems components**
2. **Know how exhaust systems operate**
 |
| **Subject** | **AC** | **Teaching and Learning Methods** |
| Exhaust system components | 1.1-1.3 | Present and discuss: the identification and purpose of each component of the exhaust system to include:* Materials – steel, stainless steel
* exhaust downpipe
* lambda sensor
* silencer, catalytic converter
* exhaust system brackets, joints and gaskets

Use visual aids to present and explain the purpose of each of the exhaust system components, use video links to manufacturers Web sites to reinforce the concepts of the system, include the different types of material used in exhaust system construction and the maintenance requirements. Highlight the sequences to be used in the removal and replacement of motorcycle exhaust systems to include:* PPE
* waiting for components to cool
* correct sequence for given motorcycle
* ventilation when engine running
* checking for leaks
* checking for correct alignment

Highlight the importance of checking for correct operation on replacement of the system to check components and to confirm functionality. |
| Operation of exhaust system components | 2.1 | Explain the basic operation of the exhaust system, including: exhaust noise reduction, reducing pollution levels to the environment, noise regulations and service and maintenance needs. Introduce learners to setting up and measuring the exhaust gasses emitted from an engine using an exhaust emission tester.Highlight the damage to the environment and the health of individuals from the toxic emissions and the legal requirements that manufacturers have to comply with.  |
| Complete Learner worksheet  | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 21 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV43 | **UNIT TITLE: MOTORCYCLE DRIVELINE MAINTENANCE** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided learning (GL): 21 Hrs**  |
| **Overview:** This unit introduces the learner to motorcycle transmission systems and covers the basic identification of the major items of the unit and their function. It also allows the learner to use workshop manuals to locate specific data. |
| **Learning Outcomes:** |
| 1. **Know about motorcycle drivelines**
2. **Know about motorcycle gearboxes**
 |
| **Subject** | **AC** | **Teaching and Learning Methods** |
| Knowledge of motorcycle drivelines | 1.1-1.2 | Present and discuss, the identification and purpose of motorcycle driveline components to include:* engine
* clutch
* gearbox
* chain and sprockets
* driveshaft and joints
* drive belt and pulleys

Introduce learners to the range of components through the use visual aids, videos and component parts, explain the purpose of each of the motorcycle driveline components.Explain the basic operational detail of the driveline systems, use video links to manufacturers Web sites to reinforce the concepts.Include the different types of driveline in common use in a variety of motorcycle applications to include, manual, automatic and CVT, the reasons for the different types. Devise handouts and provide group work to enable learners to investigate and locate the range of driveline components for a range of machine types, learners provide presentation to the group on their investigation results, facilitate the feedback and provide support where required.  |
| Knowledge of motorcycle gearboxes | 2.1-2.2 | Present and discuss, the purpose of the motorcycle gearbox to include:* provide permanent neutral
* increase torque
* allow motorcycle to accelerate
* allow motorcycle to reach suitable top speed

Use visual aids to present and explain the basic purpose of gearboxes and clutches to include:* clutch plate
* pressure plate
* springs
* thrust bearing
* casing, gears
* selector forks and drum

Explain the basic operation of gearbox and clutch components.Demonstrate the calculations associated with gearbox and final drivelines: visit workshop for learners to complete worked examples on a handout. Present and explain the basic maintenance associated with motorcycle drivelines and gearboxes; Procedures for checking and topping up manual gearbox and final drive oil levels.Procedures for removing and refitting a clutch assembly.Use devised knowledge assessment activity with learners on motorcycle drivelines to check knowledge and understanding.  |
| Complete Learner worksheet  | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study (TQT): 28 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV44 | **UNIT TITLE: MOTORCYCLE FUEL SYSTEM MAINTENANCE** |

|  |  |
| --- | --- |
| **Level: Level 1**  | **Guided Learning (GL): 21 Hrs** |
| **Overview:** This unit provides the learner with an introduction to the knowledge and skills in motorcycle fuel system components, their operation and associated maintenance tasks. |
| **Learning Outcomes:** |
| 1. **Know about the hazards connected with working on motorcycle fuel systems.**
2. **Know the main components of motorcycle fuel systems.**
 |
| **Subject** | **AC** | **Teaching and Learning Methods** |
| Hazards Connected with Working on Motorcycle Fuel Systems | 1.1-1.2 | Present and discuss, Identify typical hazards associated with working on fuel systems to include:Hazards. * Fire risks due to flammable vapours / liquids, safe systems of work
* Inhaling fumes from fuels, ensure fuel containers are sealed
* Skin irritation / diseases from contact with fuels, correct use of PPE
* Inhalation of harmful exhaust gases, suitable use of exhaust extraction

Safety precautions.* Safe conduct of individuals in workshops
* Correct use of PPE
* Use tools and equipment in correct manor
* Report defects in tools and equipment to appropriate person
* Follow COSHH instructions and guidance

Identify safe systems of work when working on fuel systems: storage of fuels, skin protection, exhaust extraction and location of fire extinguisher. Observe safe working practices by learner, use Q&A where appropriate and provide feedback on safe practices.  |
| Main Components of Motorcycle Fuel Systems.  | 2.1-2.2 | Present, discuss, identify the main components and functions of motorcycle fuel systems to include:* Fuel
* Fuel tank
* Fuel tap
* Fuel pipes and filters
* Carburettor system main components
* Fuel injection system main components
* Air filter and housing
* Throttle twist grip

Use individual components to demonstrate their function and encourage learners to inspect the resources to become familiar. Ask learners to state the names and basic function of the main components. Use videos or presentations to enhance learning and facilitate understanding. Identify the layout of each fuel system component by using a demonstration motorcycle. Use a prepared basic diagram of a fuel system to explain how the fuel is taken from the tank, to the engine and then burnt to produce mechanical energy.Use prepared laminated cards to allow each learner to identify fuel system components on a motorcycle.Use a range of motorcycles to compare the layout of components and differentiate between makes and models. Confirm learners’ understanding of component names and terminology with the use of Q&A. Prepare a simple quiz with questions on fuel systems and include diagrams for the learner to label, and use this as underpinning knowledge.Describe and identify inspection, maintenance and adjustment requirements to fuel systems and components through, presentations, handling of components, use of video`s and demonstrations. Devise questions and answers activities, group work, use of ILT where possible.  |
| Complete Learner Worksheet | 1.1-5.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 29 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV45 | **UNIT TITLE: MOTORCYCLE SPARK IGNITION SYSTEM MAINTENANCE** |

|  |  |
| --- | --- |
| **Level: Level 1**  | **Guided Learning (GL): 15 hrs** |
| **Overview:**  This unit provides the learner with an introduction to the knowledge and skills in motorcycle spark ignition system components, their operation and associated maintenance tasks.  |
| **Learning Outcomes:** |
| 1. **Know about the hazards connected with working on motorcycle spark ignition systems**
2. **Know the main components of motorcycle spark ignition systems.**
3. **Know how spark ignition systems operate**
 |
| **Subject** | **AC** | **Teaching and Learning Methods** |
| Hazards connected with working on motorcycle spark ignition systems | 1.1 | Present and discus, Identify typical hazards associated with working on spark ignition systems to include:* Electric shocks due to high voltages, working safely around live circuits
* Risk of battery acid burns, appropriate use of PPE
* Explosion due to battery fumes, safe systems of work.
* Fire risks due to ignition of flammable vapours / liquids, safe systems of work
* Inhaling fumes from fuels, ensure fuel containers are sealed.
* running engines in confined spaces
* skin irritation.

Identify safe systems of work when working on spark ignition systems: storage of fuels, skin protection, exhaust extraction and location of fire extinguisher.Learners to complete a risk assessment prior to the practical activity.Observe safe working practices by learner when completing practical tasks, use Q&A where appropriate and provide feedback on safe practices.  |
| Main components of motorcycle spark ignition systems.  | 2.1-2.2 | Present, Identify and discuss the functions of the main ignition system components to include: * Battery
* Ignition switch
* Ignition coil
* Spark plug
* Condenser
* Contact breaker (C/B) points system
* Electronic ignition system – including CDI

Using a range of visual aids, identify and state the purpose of spark ignition system components through: presentations, handling of components, use of video`s, demonstrations.Present and discuss removal and replacement of spark ignition system components. Devise questions and answers activities, group work, and use of ILT to check on learner’s knowledge and understanding. |
| Operating principles of spark ignition systems | 3.1 | Explain the purpose of the ignition system components to include:* creation of magnetic field
* electro-magnetic induction
* coil operation
* primary and secondary windings
* production of high voltage by breaking LT circuit
* layout of components in a typical breaker-less ignition system.
* function of the following components: battery, ignition coil, ignition switch, electronic trigger systems (simple concept of different types), capacitor, spark plugs, HT lead.
* basic operation of a typical breaker-less ignition circuit.
* basic principle of ignition timing.

Use presentations, handling of components, use of video`s and demonstrations to highlight the principles of operation of spark ignition systems.Use technical data and component parts to facilitate the checking and adjustment of the ignition timing. Devise questions and answers activities, group work, and use of ILT to check on learner’s knowledge and understanding.  |
| Complete learner worksheet | 1.1-6.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts.  |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 21 hrs**  |

|  |  |
| --- | --- |
| UNIT REF: L1MV47 | **UNIT TITLE: ELECTRICAL FOUNDATION SKILLS** |

|  |  |
| --- | --- |
| **Level: Level 1** | **Guided Learning (GL): 21 hrs** |
| **Overview:** This unit introduces learners to the principles of vehicle electrical systems, components and operation. It covers identifying the main components used in vehicle systems and the main electrical principles and terminology. The unit also introduces learners to the fundamental operating principles of vehicle electrical systems and components. The final outcome of the unit is concerned with the learner being able to interpret simple electrical circuits and to create their own simple vehicle lighting circuit. |
| **Learning Outcomes:** |
| **1. Know how the correct PPE required when working with electrical systems****2. Know about vehicle electrical systems and electrical principles** |
| **Subject** | **AC** | **Teaching Methods** |
| Know the correct PPE required when working with vehicle electrical systems | 1.1 | Present and discuss with learners the requirements for the correct PPE when working on electrical systems, these can include gloves, goggles, overalls. |
| Main electrical systems and components on a modern vehicle | 2.1 | Present and discuss the main electrical systems on a modern vehicle, use presentation, Video and Web sites on main architecture. Learners to investigate all the major electrical components used in modern vehicles using handout aids to assist the learners. Learners to describe the purpose of each component and any personal safety actions that need to be taken when working on these systems. Use handouts and Q&A session to check on learner’s knowledge and understanding.  |
| Simple vehicle electrical principles and laws | 2.2 | Present, discuss and use visual aids to demonstrate how magnet fields can be observed and are generated by magnets and wire.Highlight the laws of magnetism and their influence they have when poles are put together.Apply magnetism to a motor/ generator rules, apply to a vehicle system. Demonstrate how resistance creates a by-product of heat and then how we use this in a vehicle (lamps heating element) Demonstrate the actions of chemical effect: use lemons as battery to demonstrate chemical effect displaced by a battery.  |
| Main electrical units of measurement | 2.3 | Present and discuss with learners the different components that make up electrical principles.Demonstrate electric circuits and components that make up a simple circuit, Highlight and calculate simple calculations using Ohms law, learners to complete handout.Outline the dangers of working with electricity, presentation needs to include volts, amps, ohms and watt’s.Use handouts and Q&A to check on learners knowledge and understanding, provide extra support where required.  |
| Common electrical symbols | 2.4 | Present and discuss the various types of electrical symbols related to systems and circuits in the automotive industry.Learners to plan an electrical circuit using cards, they can then use these to build circuits to gain understanding of their operation in an electrical circuit.  |
| Complete Learner Worksheet | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 29 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV48 | **UNIT TITLE: LIGHTING SYSTEM MAINTENANCE** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 20 Hrs**  |
| **Overview:** This unit introduces learners to the principles of vehicle lighting systems, components and operation. It covers identifying the main components used in vehicle lighting systems. The unit also introduces learners to the fundamental operating principles of vehicle lighting systems and components. Learners also have to complete. Learners are also to complete practical activities by replacing a range of vehicle lighting circuit components and aligning a vehicle headlamp. |
| **Learning Outcomes:** |
| 1. **Know vehicle lighting systems components**
2. **Know how vehicle lighting systems operate**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Identify the main types of bulbs used on modern vehicles | 1.1 | Present and discuss the different types of bulbs that are available this should include standard bulbs cap and cap less, Halogen head lamp bulbs HID and LED, cover bulb power outputs for a given circuit / use. Highlight the Health and safety risks, and potential damage to lighting components when being handled. Learning could be done via a activity where they match the bulb to the name on a card and could be peer assessed.  |
| Identify examples of the types of headlamp units available | 1.2 | Learners to look at different types of headlamp units that area available both in their home market and overseas, highlight headlamp beam patterns and the reasons for this function. This could be done via an internet research project and then report back to the class in a presentation.  |
| State the colour of lamps that are legally required on a 4 wheeled vehicle | 1.3 | Learners need to understand the colour that relates to each light and how they fit in to the local market requirements/laws this could be done with a power point presentation and the use of feedback boards to show understanding  |
| Demonstrate the ability to accurately read and interpret a simple lighting circuit wiring diagram | 2.1 | The learner should be shown a simple wiring diagram with all the different types of electrical symbols to include:* battery symbols
* switch symbols
* wire colours
* fuse symbols
* lamp symbols
* earth symbols
* relay symbols

Devise an activity where learners put names of components to images and state the purpose of the component.  |
| State how light is emitted from a conventional bulb  | 2.2 | Using a presentation demonstrate that:* conversion of electrical energy to heat energy
* filament temperature

Learners to build a circuit where the components above are incorporated into a circuit. Demonstrate sending an electrical current through a bulb element will make it heat up and that a by-product of this is light generated this could be demonstrated in the classroom with a bulb and a low voltage power supply.  |
| State how a brake light circuit operates | 2.3 | Learners could build a simple light circuit out of components in the classroom and label the components as they sit in a brake light circuit this will need to include power and earth connections, switch, fuse and lamp units |
| Complete Learner Worksheet  | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 30 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV76 | **UNIT TITLE:** **VEHICLE EXTERIOR VALETING AND DETAILING**  |

|  |  |
| --- | --- |
| **Level: 1** | **Guided learning (GL): 15 hrs** |
| **Overview:** This unit introduces learners to the principles of exterior vehicle valeting. It includes the safe use of tools and equipment and cleaning materials for the external surfaces of vehicles. Similarly, only common cleaning materials are covered and the unit does not include specialised cleaning products often used by commercial valeting businesses.  |
| **Learning Outcomes:** |
| 1. Know valeting tools and equipment and how they are used correctly and safely
2. Know the cleaning materials and how they are used correctly and safely
 |
| **Subject** | **AC** | **Teaching Methods** |
| Tools and equipment for valeting and detailing a vehicle’s exterior. | 1.1 | Present and discuss the range of tools and equipment that may be used in completing vehicle exterior valeting and detailing, to include:* water hose (mains pressure)
* pressure washers
* cleaning brushes for paintwork
* wheel brushes or scrubbers
* sponges and buckets
* chamois leather
* polishing cloth

Use presentations and visual aids to demonstrate the use of basic tools and equipment used to clean the exterior of a vehicle.Devise question and answer activities to check on learner’s knowledge on the correct selection of tools and equipment for a given activity: wash, dry, polish, wax, and wheel clean for instance.  |
| Preparation and use of valeting tools safely and correctly. | 1.2 | Using the basic tools demonstrate the basic set up and checks to include:* ensuring sponges and cleaning cloths are free of grit and dirt prior to cleaning
* soaking and squeezing chamois leather for drying surfaces
* checks and preparation of water hoses and pressure washers

Highlight the consequences of not completing checks prior to cleaning a vehicle, an example could be:* a hose that is leaking could cause a slip accident
* dirt on a cloth could damage paint work
 |
| Cleaning materials used for valeting a vehicle’s exterior | 2.1 | Present and discuss the cleaning materials used for exterior valeting to include: * shampoo
* polish
* tyre blackener
* glass cleaner
* tar remover
* chrome cleaner
* alloy wheel cleaner
 |
| Identify the tasks and precaution forCorrectly using cleaning materials. | 2.2 | Present and discuss the checks and precautions that are required whilst using cleaning materials, to include:* following vehicle manufacturer’s recommendations
* following instructions for correct use of cleaning materials
* selecting appropriate cleaning materials for surface
* avoiding contamination or splashing of other surfaces
* avoiding the use of previously contaminated cloths

Devise a valeting planning activity which allows the learner to identify the products and the precautions required to valet and detail a specific area of a vehicle, for example: wash, dry, polish, wax or clean the wheels as in AC 2.1 above.This activity could be done individually or as part of group work, learners could present their finding back to the others in the group, facilitate feedback and promote the discussions within the group. |
| Complete Learner Worksheet  | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT) : 20 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV77 | **UNIT TITLE: ENGINE BAY VALETING AND DETAILING** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 15 hrs** |
| **Overview:** This unit introduces learners to the principles of engine bay valeting and detailing. It includes the safe use of tools and equipment and cleaning materials for the engine bay. Similarly, only common cleaning materials are covered and the unit does not include specialised cleaning products often used by commercial valeting businesses.  |
| **Learning Outcomes:** |
| 1. **Know the valeting tools and equipment and how they are used correctly and safely**
2. **Know the cleaning materials and how they are used correctly and safely**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Tools and equipment for engine bay valeting and detailing.  | 1.1 | Present and discuss the range of tools and equipment that may be used in completing engine bay valeting and detailing, to include:* water hose (mains pressure)
* pressure washers
* cleaning brushes for degreasing
* sponges and buckets
* chamois leather
* polishing cloth

Use presentations and visual aids to demonstrate the use of basic tools and equipment used to clean the engine bay of a vehicle.Devise question and answer activities to check on learner’s knowledge on the correct selection of tools and equipment for cleaning the engine bay. |
| Preparation and using valeting tools safely and correctly. | 1.2 | Using the basic tools and equipment demonstrate the basic set up and checks to include:* ensuring sponges and cleaning cloths are free of grit and dirt prior to cleaning
* soaking and squeezing chamois leather for drying surfaces
* checks and preparation of pressure cleaners

Highlight the consequences of not completing checks prior to cleaning an engine bay, an example could be:* a hose that is leaking could cause a slip accident
* dirt on a cloth could damage paint work
* damage to engine bay electrical components
 |
| Cleaning materials used for engine bay valeting and detailing  | 2.1 | Present and discuss the cleaning materials used for engine bay valeting and detailing to include: * shampoo
* polish
* degreaser
* tar remover
* dressing fluids
 |

|  |  |  |
| --- | --- | --- |
| Precautions when using cleaning materials. | 2.2 | Present and discuss the checks and precautions that are required whilst using cleaning materials, to include:* following vehicle manufacturer’s recommendations
* following instructions for correct use of cleaning materials
* selecting appropriate cleaning materials for surface
* avoiding contamination or splashing of other surfaces
* avoiding the use of previously contaminated cloths

Devise a valeting planning activity which allows the learner to identify the products and the precautions required to valet and detail a specific area of a vehicle engine bay, for example: degrease, wash, polish and applying dressing fluids as in AC 2.1 above.This activity could be done individually or as part of group work, learners could present their finding back to the others in the group, facilitate feedback and promote the discussions within the group. |
| Complete Learner Worksheet  | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 20 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV78 | **UNIT TITLE:** **VEHICLE INTERIOR VALETING AND DETAILING**  |

|  |  |
| --- | --- |
| **Level: 1** | **Guided learning (GL): 15 Hrs**  |
| **Overview:** This unit introduces learners to the principles of vehicle interior valeting. It includes the safe use of tools and equipment and cleaning materials for the internal surfaces of vehicles. Similarly, only common cleaning materials are covered and the unit does not include specialised cleaning products often used by commercial valeting businesses |
| **Learning Outcomes:** |
| 1. **Know valeting tools and equipment and how they are used correctly and safely**
2. **Know the cleaning materials and how they are used correctly and safely**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Tools and equipment for valeting and detailing a vehicle’s interior. | 1.1 | Present and discuss the range of tools and equipment that may be used in completing vehicle interior valeting and detailing, to include:* sponges and buckets
* cleaning cloth
* upholstery brush
* vacuum cleaner
* polishing cloth

Use presentations and visual aids to demonstrate the use of basic tools and equipment used to clean the interior of a vehicle.Devise question and answer activities to check on learner’s knowledge on the correct selection of tools and equipment for a given activity, cleaning: upholstery, plastic components, headlining and leather surfaces for instance.  |
| Preparation and use of valeting tools safely and correctly. | 1.2 | Using the basic tools and equipment, demonstrate the basic set up and checks to include:* ensuring sponges and cleaning cloths are free of grit and dirt prior to cleaning
* ensuring electrical appliances are safe to use

Highlight the consequences of not completing checks prior to cleaning a vehicle interior, an example could be:* a damaged electrical lead could cause an electric shock
* dirt on a cloth could damage surfaces / paint work
 |
| Cleaning materials used for valeting a vehicle’s interior | 2.1 | Present and discuss the cleaning materials used for interior valeting and detailing to include: * upholstery cleaner
* shampoo
* glass cleaner
* dashboard cleaner
* carpet shampoo
 |
| Identify the tasks and precaution for Correctly using cleaning materials. | 2.2 | Present and discuss the checks and precautions that are required whilst using cleaning materials, to include:* following vehicle manufacturer’s recommendations
* following instructions for correct use of cleaning materials
* selecting appropriate cleaning materials for surface
* avoiding contamination or splashing of other surfaces
* avoiding the use of previously contaminated cloths

Devise a valeting planning activity which allows the learner to identify the products and the precautions required to valet and detail a specific area of a vehicle, for example: vacuum, shampoo, dry, polish or wax as in AC 2.1 above.This activity could be done individually or as part of group work, learners could present their finding back to the others in the group, facilitate feedback and promote the discussions within the group. |
| Complete Learner Worksheet  | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT) : 20 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV79 | **UNIT TITLE: CLEANING AND TREATING OF FABRIC FOLDING ROOFS** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided learning (GL): 10 hrs** |
| **Overview:** This unit introduces learners to the principles of cleaning and treating of fabric folding roofs. It includes the safe use of tools and equipment and cleaning materials for the fabric folding roof. Similarly, only common cleaning materials are covered and the unit does not include specialised cleaning and treating products often used by commercial valeting businesses.  |
| **Learning Outcomes:** |
| 1. **Know valeting tools and equipment and how they are used correctly and safely**
2. **Know the cleaning materials and how they are used correctly and safely**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Tools and equipment used for cleaning and treating fabric folding roofs. | 1.1 | Present and discuss the range of tools and equipment that may be used in cleaning and treating of fabric folding roofs, to include:* sponges and buckets
* cleaning cloth (lint free)
* upholstery brush
* Air line
* Vacuumed cleaner
* Hot air gun

Use presentations and visual aids to demonstrate the use of tools and equipment used to clean and treat fabric folding roofs.Devise question and answer activities to check on learner’s knowledge on the correct selection of tools and equipment for a given activity: wash, dry, polish windows, and applying a suitable fabric sealer for instance.  |
| Preparation and using tools and equipment safely and correctly. | 1.2 | Using tools and equipment demonstrate the basic set up and checks to include:* ensuring sponges and cleaning cloths are free of grit and dirt prior to cleaning
* electrical safety associated with power hoses and vacuum cleaners

Highlight the consequences of not completing checks prior to cleaning and treating fabric roofs, an example could be:* a hose that is leaking could cause a slip accident
* dirt on a cloth could damage windows
 |
| Cleaning and treating materials used on fabric folding roofs | 2.1 | Present and discuss the cleaning and treatment materials used on fabric folding roofs to include: * vinyl/fabric cleaner
* shampoo
* glass cleaner
* vinyl/fabric roof sealer
 |
| Checks and precautions to be taken when using cleaning and treatment materials. | 2.2 | Present and discuss the checks and precautions that are required whilst using cleaning and treatment materials, to include:* following vehicle manufacturer’s recommendations
* following instructions for correct use of cleaning materials
* selecting appropriate cleaning materials for surface
* avoiding contamination or splashing of other surfaces
* avoiding the use of previously contaminated cloths
* applying treatment materials for fabric roofs

Devise a valeting and treatment planning activity which allows the learner to identify the products and the precautions required to clean and treat a specific area of a roof, for example: wash, dry, polish and applying treatment materials as in AC 2.1 above.This activity could be done individually or as part of group work, learners could present their finding back to the others in the group, facilitate feedback and promote the discussions within the group. |
| Complete Learner Worksheet  | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT) : 15 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV80 | **UNIT TITLE: REMOVE AND REPLACE A CYCLE GEAR ASSEMBLY** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 8 Hrs**  |
| **Overview:** The aim of this unit is to provide the learner with the skills and knowledge required to remove and replace the front and rear gear assembly of a cycle. |
| **Learning Outcomes:** |
| 1. **Know how cycle gearing assembly systems are constructed**
2. **Know how cycle gear assembly systems operate**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Construction of cycle gearing systems | 1.1-1.2 | Present and discuss the main components and the purpose of cycle gear assemblies to include:* front and rear gear sets
* correct chain for gear sets
* front and rear derailleurs types - component parts - cage, jockey / guide pulley, tension pulley, spring tension, adjustment screws, bearings
* gear shifter types - Index, friction, combined brake and gear, trigger, twist – movement of the gear shifter lever pulls or releases the Bowden cable on the derailleur
* Bowden cables

Use visual aids to identify the cycle gear drive assembly and components, use examples for learners to see the physical difference and try compatibility between different gear sets.Use video links to manufacturers Web sites to reinforce the concepts and the various different types. Devise question and answer activities, group work and use of ILT to check on learner’s knowledge and understanding.  |
| Operation of cycle gear assemblies | 2.1-2.2 | Present and discuss the operating principles of cycle gearing systems to include:* Selection of various gears to provide increase / decrease of torque, speed and cadence
* identifying functions of high and low limit screws, b-tension adjuster, barrel adjuster
* derailleurs moving chain between gear sets, chain tension, positioning of derailleurs
* compatible of components - compatibility of components before mixing, not all components are interchangeable particularly between different models and manufacturers

Use visual aids to present and explain the basic operational concepts of gear ratios, demonstrate the calculations of different ratios and the effects on cadence and torque multiplication. Use devised handouts for learners to calculate different gear ratios. Setting up a gear assembly.* identifying cycle gearing manufacturers components
* obtaining and using technical information to support cycle gear set up
* using the correct procedure and following manufacturers information to adjust high and low settings of derailleur mechanisms
* checking for the correct operation on completion of adjustment

Visit the workshop to demonstrate the functions of front and rear derailleurs, adjustment of limit screws, cables and positioning of derailleurs.Present and explain the basic maintenance associated with cycle gear assemblies. Demonstrate procedures for removing and refitting a gear assembly and setting up.Use devised knowledge assessment activity with learners on cycle gear assembly to check knowledge and understanding.  |
| Complete Learner worksheet  | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 12 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV81  | **UNIT TITLE: CARRY OUT A SYSTEMATIC CYCLE CHECK** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 4 Hrs**  |
| **Overview:** This unit introduces learners to the principles of carrying out a systematic cycle check. It requires learners to know the tools and equipment that would be used during a systematic cycle check. It also covers the procedures and methods that must be used to ensure this is carried out effectively.  |
| **Learning Outcomes:** |
| 1. **Know cycle components and systems that require a systematic check, basic adjustments and lubrication**
2. **Know how to complete routine systematic cycle check, basic adjustment and lubrication**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Components and systems that require a systematic check, basic adjustments and lubrication | 1.1 | Present and discuss the main components and systems that require checking, adjusting and lubrication during systematic cycle checks to include:* Tyres – wear and condition, wheels – damage, buckling
* Brakes – wear, adjustment, fluid leaks, fluid level, condition of hoses
* Steering and suspension – wheel alignment, security of components, wear of bearings, suspension damper
* Lighting – function of front and rear lamps
* Cycle framework - paintwork, seat, mirror condition, security of components and systems
* Rider controls – front and rear brakes, steering, side stand
* Component security – frame attachments, fasteners for main steering and braking systems
* Gearing – adjustment and lubrication

Present and use visual aids to identify the components that require routine inspection. Learners to produce a worksheet with an itemised list highlighting the systems and components for a given cycle to identify full details of the checks, adjustment and lubrication to be carried out.Use video links to manufacturers Web sites to research, locate and use technical data.Devise and use question and answer activities, group work and use ILT to check on learner’s knowledge and understanding where appropriate.  |
| Routine systematic cycle check, basic adjustment and lubrication | 2.1 | Present and discuss the information , tools and equipment , adjustments and lubrication required during systematic checks to include: Information. * Cycle specifications and data, cycle manufacturer’s inspection requirements, cycle manuals, cycle inspection check lists

Tools and equipment. * cycle stands, wheel alignment tools, spanners and sockets, torque wrench, screwdrivers, levers, inspection lamps, tyre pressure gauge, measurement tools

Adjustment and lubrication. * clearances
* tensions
* pressures
* alignment
* settings
* selection of correct lubricant
* correct component and location requiring lubricant

Visit the workshop to demonstrate the checks to be carried out on a cycle inspection, demonstrate the use technical data and the tools and equipment used to do so.Demonstrate the basic adjustments techniques to chain, brakes and gearing mechanisms, highlight the types of lubricants to be used and why a variety of lubricants are used.Learners to use the devised handouts to make notes of the basic adjustments and lubrication requirements. Use devised knowledge assessment activity with learners on carrying out a systematic cycle check to assess knowledge and understanding.  |
| Complete Learner worksheet  | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 8 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV82  | **UNIT TITLE: REPAIR A CYCLE PUNCTURE** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided Learning (GL): 4 hrs**  |
| **Overview:** The aim of this unit is to provide the learner with the skills and knowledge required to repair a puncture on a cycle rear wheel. |
| **Learning Outcomes:** |
| 1. **Know how cycle wheel rims, tyres and inner tube are constructed**
2. **Know wheel, tyre and inner tube terminology**
3. **Know how to repair cycle punctures**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Construction of cycle wheel rims, tyres and inner tubes | 1.1-1.3 | Present and discuss the common types of tyre, inner tubes and wheels used on cycles to include:Tyres:* street, road, trail, BMX, tube type tyres, tubeless tyres
* casing plies - the arrangement of plies
* tyre tread – types and applications for road, MTB, BMX, street
* tread depth indicator
* tyre bead, tread bracing, tyre sidewall

Inner tube construction:* Butyl, latex, anti-puncture types and liquids, Valve types - Schrader, Presta, Woods/Dunlop

Wheels:* Carbon, alloy and steel materials. Rim profiles. Tube and tubeless types

Highlight using visual aids, identify the types of construction of tyres and wheels used for cycles, list the materials used and the common features for each type.Present and use visual aids to identify the types of inner tube construction, valve arrangements and puncture avoidance materials and liquids.Use group work for learners to research the advantages and disadvantages of tyre, inner tube and wheel construction, learners to feedback to the group, facilitate discussions with the group to further understanding and knowledge.Use video links to manufacturers Web sites to research, locate and use technical data for the task.Devise and use question and answer activities, group work and use of ILT to check on learner’s knowledge and understanding. |
| Wheel, tyre and inner tube terminology  | 2.1 | Present and discuss the markings and terminology associated with tyres, inner tubes and wheels to include:* Wheel, tyre and inner tube markings - wheel diameter (metric and imperial) , tyre section width, tyre height, circumference, tread depth
* ISO 5775

Learners to carry out inspections of a range of cycle tyres, wheels and inner tubes, use devised handouts for learners to complete relating to identifying tyre types, their uses and markings found on tyres and wheels. Learners to note any faults found during the task.  |
| Repairing cycle punctures | 3.1-3.2 | Demonstrate and explain the process of carrying out a puncture repair to a cycle rear wheel to include:Repair process.* secure positioning of cycle and stands, correct selection of tools and equipment for removal of wheel, removal of tyre and inner tube, locating and repairing inner tube with suitable patch, refitting wheel, wheel alignment, wheel nut torque setting, use of torque wrench

Causes of punctures. * penetration by foreign body – thorn, nail or glass
* impact puncture – due to low inflation , sharp edges, potholes

Use visual props to support, include the different types of causes of punctures and use of puncture avoidance systems.Use visual aids to identify the types of tyre, wheel and inner tube commonly used for cycles, highlight typical faults found on tyres and wheels. Highlight health and Safety risks and hazards associated with the practical task.Use devised knowledge assessment activity with learners on carrying out a puncture repair to assess knowledge and understanding. |
| Complete Learner worksheet  | 1.1-5.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, tutorial, feedback and directed study time (TQT): 8 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV83 | **UNIT TITLE: REMOVE AND REPLACE A CYCLE RIM BRAKE ASSEMBLY** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided learning (GL): 6 Hrs** |
| **Overview:** The aim of this unit is to provide the learner with the skills and knowledge required to remove and replace a cable operated rim brake assembly. |
| **Learning Outcomes:** |
| 1. **Know how cycle rim brake systems are constructed**
2. **Know how cycle rim brakes operate**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Construction of rim brake assemblies. | 1.1-1.2 | Present and discuss the main components of the rim brake assemblies to include:* Brake - blocks, levers, cable, callipers

Purpose of.Front and rear brake levers, Bowden cables, wheel rim, Calliper types - cantilever, V , centre pull, side pullShow different types of lever and calliper mechanisms used on different types of cycle, demonstrate the adjustment methods for each type, highlight compatibility of brake system components.Describe the purpose of the main components to include, adjustment mechanisms, maintenance requirements and setting up of the rim brake. Use video links to manufacturers Web sites to reinforce the concepts.Learners to produce a procedure check list to assist with the practical task in the workshop, facilitate the task and provide feedback.  |
| Operation of rim brake assemblies | 2.1 | Explain using visual aids, the operating principles of rim brake assemblies to include:* Mechanical leverage, kinetic energy in to heat, friction between tyre and road surface
* Levers, inner and outer cables, calliper, brake blocks, calliper balancing screw, brake block wear indicator, mechanical and heat energies

Present and explain the maintenance associated with cycle rim brake assemblies and the setting up techniques, tools and equipment used for the task. Visit the workshop to demonstrate the removal and replacement process and the setting up of the rim brake assembly, include the safe disposal of used materials. Use devised knowledge assessment activity with learners on cycle gear assembly to check knowledge and understanding.  |
| Complete Learner worksheet  | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study (TQT): 11 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV46 | **UNIT TITLE: ELECTRIC MOTORCYCLE AWARENESS** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided learning (GL): 19 Hrs**  |
| **Overview:**  This unit provides the learner with the knowledge in electric motorcycle awareness, carrying out pre ride checks, setting up and the removal, charging and replacement of batteries associated with electric motorcycles |
| **Learning Outcomes:** |
| 1. **Know the laws in connection with riding an electric motorcycles on public highways**
2. **Know about the hazards connected with working on electrically driven motorcycle systems**
3. **Know the main components of electric motorcycles**
4. **Know how to complete a pre ride check and set up electric motorcycle components**
5. **Know the different types of electric motorcycle drive systems**
 |
| **Subject** | **AC** | **Teaching and Methods** |
| Laws connected to riding electric motorcycles | 1.1-1.2 | Present and discuss an overview of information on the laws and legislation regarding the use of electric motorcycles on public highways to include:* Minimum age to be able to ride and electric motorcycle 16 years old
* Registration, taxation, insurance, MOT, crash helmet.
* Driving licence categories: Mopeds, A, A1, A2 engine powers associated with each group.
* Motorcycle must meet with United Kingdom type approval regulations if it is to be used on the road. Certificate of Conformity. Comply with European Community Whole Vehicle Type Approval (ECWVTA)

Provide learners with an activity sheet of topics related to unit content. Introduce learners to and have them use the DVSA Web site to research a range of learning outcomes as part of a group work activity. Learners to present to the group their findings on the assessment criteria, facilitate the feedback and ensure assessment criteria outcomes are completed. Explain and highlight laws are subject to change and to ensure using reliable information sources to check on legislation. Use Q&A to check on learner’s progress and promote further discussions to advance knowledge and understanding.  |
| Hazards associated with working on electric motorcycles | 2.1-2.3 | Present and discuss precautions associated with working on electric motorcycles to include: * Identifying the colours associated with high voltage wires
* Knowing the risks of electric shock
* Understanding heat is generated from electrical components
* Electrical components can cause fire
* Electric cycles have high voltage levels of batteries and chargers
* Safely charging of batteries
* Risks associated with charging batteries

Devise and use knowledge task sheets for learners to complete related to the assessment criteria.Introduce learners to Health and Safety Executive Web (HSE) site as up to date information sources and examples of test cases. Use devised Q&A and quizzes to check on learner’s knowledge and understanding and facilitate the quiz, use of group work where appropriate.  |
| The main components of electric motorcycles | 3.1-3.2 | Present and discuss the main components and functions of electric motorcycles to include:* Battery pack
* Controller
* Throttle
* Pedal sensor
* Electric motor
* Charger
* Console (Visual Display unit)
* Brake sensor

Use visual aids to introduce learners to the main components and their operation associated with electric motorcycles, learners to handle a range of components.Discuss the basic operation of the components and their inter dependency of each other for effective operation.Use group work and have learners to use the Web to research the range of motorcycles, types, voltages and power outputs of electric motorcycles.Discuss their findings and promote discussion with use of Q&A to check progress and understanding.  |
| Pre ride checks and setting up  | 4.1-4.3 | Present and discuss pre ride checks required by electric motorcycles to include:* Brake condition and operation
* Condition of tyre and tyre pressures
* Steering controls
* Chain tension and lubrication
* Battery security and state of charge
* Throttle, brake sensor and kill switch operation
* Equipment and component safety and condition checks
* Display console, battery state of charge
* Wiring security and connections to components
* Settings and controls operation

Charging a battery.* Correct procedures for the removal, replacement and charging of motorcycle battery pack safely
* Battery maintenance, manufacturers’ information, cycling of batteries, operating temperatures.

Setting up an electric motorcycle. * Manufacturer's instructions
* Operation of all controls

Facilitate discussions with learners on the pre ride checks, removal and replacement of batteries, and how to set up the electric motorcycle.Learners to develop a check sheet with specific details on the checks to be carried out, how to remove, charge and replace the battery pack and how to set up the motorcycle for safe use. Learners to use manufacturers Web sites as part of research into compiling the lists, facilitate the activity, learners to present findings back to the group, ensure all objectives are met.Discuss their findings and promote discussion with use of Q&A to check progress and understanding |
| Different types of electric drive systems | 5.1 | Present and discuss the different types of drive mechanisms used on electric motorcycles to include:* Direct drive
* Drive through a gearbox

Use visual aids to highlight the different types of electric motors used on electric motorcycles, highlight the various power outputs and positioning of the motors. Highlight the advantages / disadvantages of using electric motorcycles and the environmental benefits. Use recent statistics to electric vehicle registration numbers and future developments.  |
| Complete Learner worksheet  | 1.1-5.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study time (TQT): 24 hrs** |

|  |  |
| --- | --- |
| UNIT REF: L1MV84 | **UNIT TITLE: INTRODUCTION TO ELECTRIC CYCLES** |

|  |  |
| --- | --- |
| **Level: 1** | **Guided learning (GL): 8 hrs** |
| **Overview:** This unit provides the learner with the introduction to electric cycles and the main components. The learner will gain knowledge in carrying out pre ride checks, setting up and the removal, charging and replacement of batteries associated with electric cycles. |
| **Learning Outcomes:** |
| 1. **Know the laws in connection with riding an electric cycle**
2. **Know the main components of electric cycles**
3. **Know how to complete a pre ride check and set up on electric cycle components**
4. **Know the different types of electric cycle drive systems**
 |
| **Subject** | **AC** | **Teaching Methods** |
| Laws connected to riding electric cycles | 1.1-1.2 | Present and discuss the laws and legislation relating to the use of electric cycles and pedelecs on the public highway to include:* age limits (14 and over), registration, taxation and insurance
* electric motor speed limits
* electric cycle unladen weight
* electric motor maximum power output
* manufacturers name, battery voltage and electric motor power output signage

Present learners with an overview of information on the laws and legislation regarding the use of electric cycles and pedelecs on public highways. Provide learners with an activity sheet of topics related to unit content for them to research the answers.State the purpose and introduce learners to, and have them use the DVSA Web site to research a range of topics relating to the assessment criteria as part of a group work activity. Learners to present to the group their findings, facilitate the feedback and ensure outcomes are completed. Explain and highlight laws are subject to change, and to ensure using reliable information sources to check on legislation such as the DVSA. Use question and answer activities to check on learner’s progress and promote further discussions to advance knowledge and understanding.  |
| The main components of electric cycles | 2.1-2.3 | Highlight the main difference between pedal assist and power on demand systems.Highlight the risks and hazards associated with electric cycles and pedelecs from a user’s and maintenance perspective. Present and use visual aids to introduce learners to the main components and their operation associated with electric cycles to include:* Battery pack
* Controller
* Throttle
* Pedal sensor
* Electric motor
* Charger
* Console (Visual Display unit)
* Brake sensor

Learners to handle a range of components that are commonly used.Discuss the basic operation of the components and their inter dependency of each other for safe and effective operation.Learners to complete an activity sheet, use group work and have learners use the Web to research the range of cycles on sale, types and uses, voltages and power outputs of electric cycles and pedelecs, link their findings to legislation and the laws of UK, facilitate discussions and feedback. Use quizzes to promote discussion with use of question and answer activities to check progress and understanding on the main components of electric cycles.  |
| Pre ride checks and setting up electric cycles | 3.1-3.3 | Present and discuss with learners on the pre ride checks, removal and replacement of batteries, and how to set up the electric motorcycle to include:Pre ride checks. * Brake condition and operation
* Condition of tyre and tyre pressures
* Steering controls
* Chain tension and lubrication
* Pedal assist levels operation
* Throttle, brake sensor and kill switch operation
* Steering controls
* Pedal security
* Equipment and component safety and condition checks
* State of battery charge display on console
* Wiring security and connections to components
* Settings and controls

Removing, charging and replacing batteries. * Correct procedures for the removal, replacement and charging of battery pack to the cycle safely

Setting up electric cycles.* Manufacturer's instructions
* Operation of all controls

Learners to develop check sheets with specific details on the checks to be carried out, how to remove, charge and replace the battery pack and how to set up the electric cycle for safe use. Learners to use manufacturers Web sites as part of research into compiling the lists, facilitate the activity.Learners to present findings back to the group, ensure all objectives are met.Discuss their findings and promote discussion with use of Q&A to check progress and understanding |
| Different types of electric drive systems | 4.1 | Present and use visual aids to highlight the different types of electric motors used on electric cycles and pedelecs, highlight the various power outputs and positioning of the motors. Highlight the advantages / disadvantages of using electric cycles and pedelecs to the environmental benefits.Use recent statistics to electric cycle numbers for sale and now being used on UK roads and the future development potential.  |
| Complete Learner worksheet  | 1.1-4.1 | Advise and coach the learners to complete the worksheet and supplement it with additional information and handouts. |
|  |
| **Theory, practical sessions, assessments, tutorial, feedback and directed study (TQT): 13 hrs** |