



## Content

IMI Entry Level 3 Award  
Introduction to Automotive Maintenance and  
Repair  
Qualification ID No: 603/7593/0

IMI Entry Level 3 Certificate  
Introduction to Automotive Maintenance and  
Repair  
Qualification ID No: 603/7592/9

IMI Entry Level 3 Diploma  
Introduction to Automotive Maintenance and  
Repair  
Qualification ID No: 603/7591/7

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For Office Use Only		
Issue and date	Change detail	Section/page
Issue 1 April 2021	Original	N/A
Owner: Product Development		

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# Unit E3AMR01: Introduction to Health and Safety in the Workplace

**Rationale:** This unit will provide the learner with the knowledge and understanding of workshop health and safety practices and a range of personal protective equipment typically used in the automotive industry.

Unit Content	Learning Outcome
<p>Know personal protective equipment to be selected for specific automotive related tasks, to include:</p> <ul style="list-style-type: none"> <li>a. Personal Protective Equipment, to include:               <ul style="list-style-type: none"> <li>i. PPE and safety equipment checks</li> <li>ii. footwear</li> <li>iii. overalls/clothing</li> <li>iv. gloves</li> <li>v. eye protection</li> <li>vi. ear protection</li> <li>vii. face protection</li> <li>viii. skin protection</li> <li>ix. masks/respirator</li> <li>x. head protection</li> <li>xi. correctly fitting clothing</li> <li>xii. clothing specifically designed for the task</li> <li>xiii. employers' legal responsibilities for supplying appropriate PPE</li> </ul> </li> </ul>	1
<p>Know the meaning of common automotive workshop safety signs, to include:</p> <ul style="list-style-type: none"> <li>a. Workshop safety signs, to include:               <ul style="list-style-type: none"> <li>i. mandatory</li> <li>ii. prohibition</li> <li>iii. fire</li> <li>iv. general safety</li> <li>v. warning</li> <li>vi. colours and meanings</li> </ul> </li> </ul>	2
<p>Know workshop emergency evacuation procedures, to include:</p> <ul style="list-style-type: none"> <li>a. Emergency evacuation procedures:               <ul style="list-style-type: none"> <li>i. emergency exit location</li> <li>ii. emergency procedures</li> <li>iii. good and poor practices</li> <li>iv. assembly points</li> </ul> </li> <li>b. Following the fire alarm emergency procedure</li> </ul>	3
<p>Know unsafe workshop practices, to include:</p> <ul style="list-style-type: none"> <li>a. Workshop Safety:               <ul style="list-style-type: none"> <li>i. hazards and risks</li> <li>ii. safe working practices</li> <li>iii. examples of good and bad practice</li> <li>iv. following instructions and equipment guidelines for use</li> </ul> </li> </ul>	4

## Unit E3AMR02: Introduction to Common Tools and Equipment for Vehicle Maintenance and Repair

**Rationale:** This unit will enable the learner to recognise common hand tools and workshop equipment used in the maintenance and repair of vehicles and machinery. The tools referred to in this unit are transferable across all the disciplines in this qualification and can be referenced to other units. The learner may demonstrate the use of common tools and equipment by completing a practical task or project.

Unit Content	Learning Outcome
<p>Know how to select the correct PPE when using hand tools, to include:</p> <ul style="list-style-type: none"> <li>i. selecting the correct PPE for the job being undertaken</li> <li>ii. pre-checks to be carried out on PPE to ensure it is safe to use prior to the job</li> <li>iii. how to use PPE correctly</li> <li>iv. how to report PPE defects to the appropriate individual</li> </ul>	1
<p>Know a range of common workshop tools and equipment, to include:</p> <ul style="list-style-type: none"> <li>a. Types of hand tools used in vehicle maintenance, to include: <ul style="list-style-type: none"> <li>i. pliers: cutting and locking</li> <li>ii. spanners: open and ring</li> <li>iii. screwdrivers: flat, Philips, Torx and posidrive</li> <li>iv. ratchet and sockets</li> <li>v. hammers: ball pein, mallet and specialist</li> <li>vi. hacksaws: junior and heavy duty including various types of blade</li> <li>vii. file: engineers and specialist, selection for typical types of operation</li> <li>viii. drill bits</li> </ul> </li> <li>b. Types of measuring equipment commonly used in an automotive workshop, to include: <ul style="list-style-type: none"> <li>i. tape measure</li> <li>ii. steel rule</li> <li>iii. feeler blades</li> <li>iv. micrometers</li> <li>v. vernier</li> <li>vi. tread depth gauges</li> <li>vii. torque wrench</li> </ul> </li> <li>c. Common equipment found in an automotive workshop, to include: <ul style="list-style-type: none"> <li>i. inspection lamp</li> <li>ii. pop rivet gun</li> <li>iii. hand drill: electric and pneumatic</li> <li>iv. exhaust emission and dust extraction</li> <li>v. lifting equipment e.g. jacks, ramps and axle stands</li> <li>vi. air lines and attachments e.g. air ratchet, impact wrench, blow guns, tyre inflator/gauge</li> <li>vii. mains electrical apparatus e.g. drills, extension leads, parts cleaner</li> <li>viii. task specific specialist tools e.g. tracking gauges (simple optical), filter straps, waste oil drainers</li> </ul> </li> </ul>	2

**Continued**

## d. Body repair tools and equipment, to include:

- i. trim removal tools
- ii. screwdrivers
- iii. spanners
- iv. ratchets and sockets
- v. pliers
- vi. planishing hammer
- vii. toe dolly
- viii. spreader
- ix. onion board
- x. mag welder
- xi. self-locking clamps
- xii. pneumatic drill/hole punch
- xiii. riveter
- xiv. adhesive applicator gun
- xv. sanding blocks
- xvi. spot welding equipment
- xvii. degreaser dispenser
- xviii. dust extraction equipment

## e. Paint refinishing tools and equipment, identification, preparation and how to use, to include:

- i. an aerosol can
- ii. aerosol can trigger applicator
- iii. sanding blocks including rubber block and blocks incorporating dust extraction
- iv. degreaser dispenser
- v. masking paper dispenser
- vi. dust extraction equipment

## f. How to check, prepare and use, to include:

- i. tools and equipment
- ii. checks for safe use
- iii. kitemarks
- iv. examine and inspect for faults
- v. techniques and tips for using tools and equipment
- vi. holding, gripping and securing whilst working
- vii. consulting manufacturer's information and guidance

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# Unit E3AMR03: Introduction to Engine Components and Operation

**Rationale:** In this unit learners will investigate the main components of an engine and the operating principles of the four-stroke internal combustion engine.

Unit Content	Learning Outcome
<p>Know about four stroke internal combustion engines, to include:</p> <ul style="list-style-type: none"> <li>a. The four-stroke cycle is               <ul style="list-style-type: none"> <li>i. induction</li> <li>ii. compression</li> <li>iii. power</li> <li>iv. exhaust</li> </ul> </li>   <li>b. The main engine components, to include:               <ul style="list-style-type: none"> <li>i. crankshaft</li> <li>ii. connecting rods</li> <li>iii. pistons</li> <li>iv. crankcase</li> <li>v. rocker or camshaft cover</li> <li>vi. cylinder head</li> <li>vii. camshaft</li> <li>viii. valves</li> <li>ix. oil pump</li> <li>x. sump</li> <li>xi. coolant pump</li> <li>xii. timing belt or chain</li> <li>xiii. flywheel</li> <li>xiv. alternator</li> <li>xv. starter motor</li> </ul> </li>   <li>c. The removal and replacement procedures, to include:               <ul style="list-style-type: none"> <li>i. PPE to be used for the task</li> <li>ii. preparing the work area</li> <li>iii. selecting appropriate information for the task</li> <li>iv. appropriate selection and use of tools and equipment</li> <li>v. safe working practices</li> <li>vi. hazards associated with the task</li> <li>vii. how to remove and refit the component</li> <li>viii. the importance of leaving the work area in a clean and safe condition</li> </ul> </li> </ul>	<p>1</p>

## Unit E3AMR04: Introduction to Lubrication System Components and Maintenance

**Rationale:** In this unit learners will investigate the main components of an engine lubrication system and carry out simple maintenance checks.

Unit Content	Learning Outcome
<p>Know about engine lubrication systems, to include:</p> <ul style="list-style-type: none"> <li>a. Why lubrication systems are required, to include:               <ul style="list-style-type: none"> <li>i. reduces friction</li> <li>ii. reduces wear</li> <li>iii. carries away metal and carbon particles</li> <li>iv. cools the surface</li> </ul> </li> <li>b. Identify lubrication system components, to include:               <ul style="list-style-type: none"> <li>i. engine oil and classification</li> <li>ii. oil filler cap</li> <li>iii. oil filter</li> <li>iv. dipstick</li> <li>v. oil pump</li> <li>vi. oil pick up</li> <li>vii. sump</li> <li>viii. oil pressure warning device</li> <li>ix. oil pump</li> </ul> </li> <li>c. The inspection and checking procedures, to include:               <ul style="list-style-type: none"> <li>i. PPE to be used for the task</li> <li>ii. preparing the work area</li> <li>iii. selecting appropriate information for the task</li> <li>iv. appropriate selection and use of tools and equipment</li> <li>v. safe working practices</li> <li>vi. hazards associated with the task</li> <li>vii. how to carry out simple checks; oil levels, specification and leaks</li> <li>viii. the importance of leaving the work area in a clean and safe condition</li> </ul> </li> <li>d. How to correctly check oil levels and top up if required, to include:               <ul style="list-style-type: none"> <li>i. check vehicle positioned on level ground</li> <li>ii. remove dipstick and clean</li> <li>iii. replace dipstick and recheck oil level</li> <li>iv. top up oil to correct level using the correct grade of engine oil</li> <li>v. recheck</li> </ul> </li> <li>e. Identify the correct specification of oil from technical specifications:               <ul style="list-style-type: none"> <li>i. locate vehicle and engine details</li> <li>ii. select appropriate technical information source</li> <li>iii. locate correct oil type and quantity</li> </ul> </li> <li>f. Check a lubrication system for leaks, to include:               <ul style="list-style-type: none"> <li>i. visual inspection of all main areas - engine stationary</li> <li>ii. visual inspection of all main areas - engine running</li> </ul> </li> </ul>	<p>1</p>



# Unit E3AMR05: Introduction to Engine Cooling System Components and Maintenance

**Rationale:** In this unit learners will investigate the main components of an engine cooling system and carry out simple maintenance checks.

Unit Content	Learning Outcome
<p>Know about engine cooling systems, to include:</p> <ul style="list-style-type: none"> <li>a. Identify the main liquid cooling system components, to include:               <ul style="list-style-type: none"> <li>i. engine coolant</li> <li>ii. radiator</li> <li>iii. expansion reservoir</li> <li>iv. coolant pressure cap</li> <li>v. pipes and hoses</li> <li>vi. coolant pump</li> <li>vii. thermostat</li> <li>viii. engine temperature gauge</li> </ul> </li> <li>b. How to correctly check coolant level and top up if required, to include:               <ul style="list-style-type: none"> <li>i. checking coolant temperature</li> <li>ii. visual inspection of level</li> <li>iii. slow removal of cap</li> <li>iv. top up to correct level with coolant</li> <li>v. refit cap</li> </ul> </li> <li>c. Demonstrate how to check the freezing point of coolant with a hydrometer, to include:               <ul style="list-style-type: none"> <li>i. taking sample of coolant</li> <li>ii. check freezing point</li> </ul> </li> <li>d. Check a cooling system for leaks - No pressure testing equipment to be used:               <ul style="list-style-type: none"> <li>i. visual inspection of all main components</li> </ul> </li> <li>e. The inspection and checking procedures to include:               <ul style="list-style-type: none"> <li>i. PPE to be used for the task</li> <li>ii. preparing the work area</li> <li>iii. selecting appropriate information for the task</li> <li>iv. appropriate selection and use of tools and equipment</li> <li>v. safe working practices</li> <li>vi. hazards associated with the task</li> <li>vii. how to carry out simple checks; coolant levels and strength, leaks</li> <li>viii. the importance of leaving the work area in a clean and safe condition</li> </ul> </li> </ul>	<p>1</p>

## Unit E3AMR06: Introduction to Spark Ignition System Components and Maintenance

**Rationale:** In this unit learners will investigate the main components of spark ignition systems and carry out simple maintenance.

Unit Content	Learning Outcome
<p>Know about spark ignition systems, to include:</p> <p>Note: Due to the large variations in spark ignition systems used by manufacturers, it is recommended that the following is used as an example:</p> <ul style="list-style-type: none"> <li>a. Main purpose of spark ignition system components, to include:               <ul style="list-style-type: none"> <li>i. ignition coil: including coil on plug (COP), wasted spark coil packs</li> <li>ii. spark plugs</li> <li>iii. ECU</li> <li>iv. camshaft sensor</li> <li>v. crankshaft sensor</li> <li>vi. knock sensor</li> </ul> </li> </ul> <p>However, it is permissible to contextualise those components listed above to the type that the learner will be working with.</p> <ul style="list-style-type: none"> <li>b. The main purpose of spark ignition, to include:               <ul style="list-style-type: none"> <li>i. providing a high voltage spark to ignite the fuel and air mixture</li> <li>ii. providing the spark at the correct time</li> </ul> </li> <li>c. The removal, replacement and simple maintenance procedures, to include:               <ul style="list-style-type: none"> <li>i. PPE to be used for the task</li> <li>ii. preparing the work area</li> <li>iii. selecting appropriate information for the task</li> <li>iv. appropriate selection and use of tools and equipment</li> <li>v. safe working practices</li> <li>vi. hazards associated with the task</li> <li>vii. how to remove and refit spark plugs and ignition coil</li> <li>viii. the importance of leaving the work area in a clean and safe condition</li> </ul> </li> </ul>	<p>1</p>

## Unit E3AMR07: Introduction to Spark Ignition Fuel System Components and Maintenance

**Rationale:** In this unit learners will investigate the main components of spark ignition fuel systems and carry out simple maintenance.

Unit Content	Learning Outcome
<p>Know about spark ignition fuel systems, to include:</p> <p>Note: Due to the large variations in spark ignition fuel systems used by manufacturers, it is recommended that the following is used as an example:</p> <ul style="list-style-type: none"> <li>a. Main purpose of spark ignition fuel system components, to include:               <ul style="list-style-type: none"> <li>i. fuel tank</li> <li>ii. fuel level warning device</li> <li>iii. fuel lines and pipes</li> <li>iv. fuel filter</li> <li>v. fuel pressurising system: pump, pressure regulator</li> <li>vi. fuel delivery system: injector</li> <li>vii. air intake and filtration</li> </ul> </li> </ul> <p>However, it is permissible to contextualise those components listed above to the type that the learner will be working with.</p> <ul style="list-style-type: none"> <li>b. The removal, replacement and simple maintenance procedures, to include:               <ul style="list-style-type: none"> <li>i. PPE to be used for the task</li> <li>ii. preparing the work area</li> <li>iii. selecting appropriate information for the task</li> <li>iv. appropriate selection and use of tools and equipment</li> <li>v. safe working practices</li> <li>vi. hazards associated with the task</li> <li>vii. how to remove and refit an air filter, and checking exhaust emissions, and for leaks</li> <li>viii. the importance of leaving the work area in a clean and safe condition</li> </ul> </li> <li>c. The safety factors to be considered when working with fuel systems, to include:               <ul style="list-style-type: none"> <li>i. fire precautions</li> <li>ii. exhaust fumes when running an engine in a workshop</li> <li>iii. handling and disposing of materials</li> <li>iv. preventing ingress of dirt, moisture and foreign matter</li> </ul> </li> <li>d. Appropriate ways to dispose of waste products in accordance with environmental guidance, to include:               <ul style="list-style-type: none"> <li>i. disposal of used air filters</li> <li>ii. disposal of contaminated or spilt fuel</li> <li>iii. clearing up spillages and disposal of absorbent materials</li> </ul> </li> </ul>	<p>1</p>

## Unit E3AMR08: Introduction to Compression Ignition Fuel System Components and Maintenance

**Rationale:** In this unit learners will investigate the main components of compression ignition fuel systems and carry out simple maintenance.

Unit Content	Learning Outcome
<p>Know about compression ignition fuel systems, to include:</p> <p>Note: Due to the large variations in compression ignition fuel systems used by manufacturers, it is recommended that the following is used as an example:</p> <ol style="list-style-type: none"> <li>a. Main purpose of compression ignition fuel system components, to include:               <ol style="list-style-type: none"> <li>i. fuel tank</li> <li>ii. fuel level warning device</li> <li>iii. fuel lines and pipes</li> <li>iv. fuel filter</li> <li>v. fuel pressurising system: pump, pressure regulator</li> <li>vi. fuel delivery system: injector</li> <li>vii. air intake and filtration</li> </ol> </li> </ol> <p>However, it is permissible to contextualise those components listed above to the type that the learner will be working with.</p> <ol style="list-style-type: none"> <li>b. The removal, replacement and simple maintenance procedures, to include:               <ol style="list-style-type: none"> <li>i. PPE to be used for the task</li> <li>ii. preparing the work area</li> <li>iii. selecting appropriate information for the task</li> <li>iv. appropriate selection and use of tools and equipment</li> <li>v. safe working practices</li> <li>vi. hazards associated with the task</li> <li>vii. how to remove and refit an air filter, and checking exhaust emissions, and for leaks</li> <li>viii. the importance of leaving the work area in a clean and safe condition</li> </ol> </li> <li>c. The safety factors to be considered when working with fuel systems, to include:               <ol style="list-style-type: none"> <li>i. fire precautions</li> <li>ii. exhaust fumes when running an engine in a workshop</li> <li>iii. handling and disposing of materials</li> <li>iv. preventing ingress of dirt, moisture and foreign matter</li> </ol> </li> <li>d. Appropriate ways to dispose of waste products in accordance with environmental guidance, to include:               <ol style="list-style-type: none"> <li>i. disposal of used air filters</li> <li>ii. disposal of contaminated or spilt fuel</li> <li>iii. clearing up spillages and disposal of absorbent materials</li> </ol> </li> </ol>	<p>1</p>

# Unit E3AMR09: Introduction to Exhaust System Components and Maintenance

**Rationale:** In this unit learners will investigate the main components of exhaust systems and carry out simple maintenance.

Unit Content	Learning Outcome
<p>Know about exhaust systems to include:</p> <p>Note: Due to the large variations in engine types and exhaust systems used by manufacturers, it is recommended that the following is used as an example</p> <ul style="list-style-type: none"> <li>a. Main purpose of exhaust system components, to include:               <ul style="list-style-type: none"> <li>i. manifold</li> <li>ii. downpipe</li> <li>iii. catalytic converter</li> <li>iv. particulate filter</li> <li>v. resonator</li> <li>vi. silencer</li> <li>vii. mountings and clamps</li> </ul> </li> <li>b. the main purpose of the exhaust system, to include:               <ul style="list-style-type: none"> <li>i. to reduce engine exhaust noise to acceptable levels for the comfort of vehicle occupants</li> <li>ii. to reduce harmful exhaust emissions of the engine to current legal limits</li> </ul> </li> </ul> <p>However, it is permissible to contextualise those components listed above to the type that the learner will be working with.</p> <ul style="list-style-type: none"> <li>c. The removal, replacement and simple maintenance procedures, to include:               <ul style="list-style-type: none"> <li>i. PPE to be used for the task</li> <li>ii. preparing the work area</li> <li>iii. selecting appropriate information for the task</li> <li>iv. appropriate selection and use of tools and equipment</li> <li>v. safe working practices</li> <li>vi. hazards associated with the task</li> <li>vii. how to remove and refit an exhaust silencer, check the exhaust system condition and check for any leaks</li> <li>viii. the importance of leaving the work area in a clean and safe condition</li> </ul> </li> <li>d. The safety factors to be considered when working with exhaust systems, to include:               <ul style="list-style-type: none"> <li>i. fire precautions</li> <li>ii. exhaust fumes when running an engine in a confined space</li> <li>iii. handling and disposing of materials</li> <li>iv. risk of burns and moving parts</li> </ul> </li> </ul>	<p>1</p>

## Unit E3AMR10: Introduction to Steering System Components and Maintenance

**Rationale:** In this unit learners will investigate the main components of steering systems and carry out simple maintenance checks.

Unit Content	Learning Outcome
<p>Know about steering systems, to include:</p> <ol style="list-style-type: none"> <li>a. Functions of steering systems, to include:               <ol style="list-style-type: none"> <li>i. a mechanism for the driver to hold the straight-ahead position and a means of changing vehicle direction</li> <li>ii. be light and easy to operate</li> </ol> </li> <li>b. How the driver converts effort into force to turn the wheels, to include:               <ol style="list-style-type: none"> <li>i. rotary movement at the steering wheel turned into linear movement at the wheels</li> <li>ii. how gearing is used to decrease driver's effort</li> </ol> </li> </ol> <p>Note: Due to the large variations in steering systems used by manufacturers, it is recommended that the following is used as an example:</p> <ol style="list-style-type: none"> <li>c. The main components of a vehicle steering system, to include:               <ol style="list-style-type: none"> <li>i. steering wheel</li> <li>ii. steering column</li> <li>iii. steering gear</li> <li>iv. track rods</li> </ol> </li> </ol> <p>However, it is permissible to contextualise those components listed above to the type that the learner will be working with.</p> <ol style="list-style-type: none"> <li>d. The simple maintenance procedures, to include:               <ol style="list-style-type: none"> <li>i. PPE to be used for the task</li> <li>ii. preparing the work area</li> <li>iii. selecting appropriate information for the task</li> <li>iv. appropriate selection and use of tools and equipment</li> <li>v. safe working practices</li> <li>vi. hazards associated with the task</li> <li>vii. how to carry out simple wheel alignment checks</li> <li>viii. the importance of leaving the work area in a clean and safe condition</li> </ol> </li> </ol>	<p>1</p>

# Unit E3AMR11: Introduction to Suspension System Components and Maintenance

**Rationale:** In this unit learners will investigate the main components of suspension systems and carry out simple maintenance checks.

Unit Content	Learning Outcome
<p>Know about suspension systems, to include:</p> <ul style="list-style-type: none"> <li>a. Functions of suspension systems, to include               <ul style="list-style-type: none"> <li>i. to provide a safe and pleasant ride for the vehicle occupants</li> <li>ii. to provide positive steering and handling of the vehicle</li> <li>iii. to enable the driver/rider to be in full control of the vehicle under all conditions</li> </ul> </li> </ul> <p>Note: Due to the large variations in suspension systems used by manufacturers, it is recommended that the following is used as an example:</p> <ul style="list-style-type: none"> <li>b. The main components of suspension systems, to include:               <ul style="list-style-type: none"> <li>i. telescopic dampers</li> <li>ii. leaf springs</li> <li>iii. coil springs</li> <li>iv. torsion bars</li> <li>v. McPherson strut</li> <li>vi. anti-roll bars</li> <li>vii. suspension arms</li> </ul> </li> </ul> <p>However, it is permissible to contextualise those components listed above to the type that the learner will be working with.</p> <ul style="list-style-type: none"> <li>c. The simple maintenance procedures, to include:               <ul style="list-style-type: none"> <li>i. PPE to be used for the task</li> <li>ii. preparing the work area</li> <li>iii. selecting appropriate information for the task</li> <li>iv. appropriate selection and use of tools and equipment</li> <li>v. safe working practices</li> <li>vi. hazards associated with the task</li> <li>vii. how to check a suspension system for leaks</li> <li>viii. the importance of leaving the work area in a clean and safe condition</li> </ul> </li> </ul>	<p>1</p>

# Unit E3AMR12: Introduction to Braking System Components and Maintenance

**Rationale:** In this unit learners will investigate the main components of braking systems and carry out simple maintenance.

Unit Content	Learning Outcome
<p>Know about braking systems, to include:</p> <ul style="list-style-type: none"> <li>a. Function of the braking system, to include:               <ul style="list-style-type: none"> <li>i. to convert kinetic energy into heat energy</li> <li>ii. to slow down, stop and hold the vehicle stationary</li> </ul> </li> <li>b. The main braking system components, to include:               <ul style="list-style-type: none"> <li>i. discs</li> <li>ii. calipers</li> <li>iii. brake pads</li> <li>iv. drums</li> <li>v. brake shoes</li> <li>vi. wheel cylinders</li> <li>vii. master cylinder</li> <li>viii. flexible brake hoses</li> <li>ix. metal pipes</li> </ul> </li> <li>c. The simple maintenance procedures, to include:               <ul style="list-style-type: none"> <li>i. PPE to be used for the task</li> <li>ii. preparing the work area</li> <li>iii. selecting appropriate information for the task</li> <li>iv. appropriate selection and use of tools and equipment</li> <li>v. safe working practices</li> <li>vi. hazards associated with the task</li> <li>vii. how to remove and refit brake pads and carry out simple maintenance</li> <li>viii. the importance of leaving the work area in a clean and safe condition</li> </ul> </li> <li>d. How to dispose of:               <ul style="list-style-type: none"> <li>i. brake friction materials: pads and shoes</li> <li>ii. used brake fluid</li> <li>iii. absorbent materials when spillages have been cleaned up</li> </ul> </li> </ul>	<p>1</p>



# Unit E3AMR13: Introduction to Wheel and Tyre Construction and Maintenance

**Rationale:** In this unit learners will be introduced to the basic construction of wheels and tyres and carry out simple maintenance.

Unit Content	Learning Outcome
<p>Know the basic construction of wheels, to include:</p> <ul style="list-style-type: none"> <li>a. The common types of wheel used on vehicles, to include:               <ul style="list-style-type: none"> <li>i. alloy wheels</li> <li>ii. pressed steel wheels</li> <li>iii. wire wheels</li> <li>iv. space saver wheels</li> </ul> </li> <li>b. Safety precautions and removing a vehicle wheel, to include:               <ul style="list-style-type: none"> <li>i. vehicle positioned on firm level ground</li> <li>ii. ensuring vehicle lifting and supporting equipment is safe and in a suitable condition</li> <li>iii. using the correct lifting, removal and replacement of wheel procedures</li> <li>iv. lowering the vehicle to the floor safely</li> <li>v. ensuring the wheel is torqued to manufacturer's settings</li> </ul> </li> <li>c. The simple maintenance procedures, to include:               <ul style="list-style-type: none"> <li>i. PPE to be used for the task</li> <li>ii. preparing the work area</li> <li>iii. selecting appropriate information for the task</li> <li>iv. appropriate selection and use of tools and equipment</li> <li>v. safe working practices</li> <li>vi. hazards associated with the task</li> <li>vii. how to remove and refit a vehicle wheel</li> <li>viii. the importance of leaving the work area in a clean and safe condition</li> </ul> </li> </ul>	1
<p>Know the basic construction of tyres, to include:</p> <ul style="list-style-type: none"> <li>a. The main markings and terminology associated with vehicle wheels and tyres, to include:               <ul style="list-style-type: none"> <li>i. tyre type</li> <li>ii. tyre size</li> <li>iii. speed rating</li> <li>iv. wheel diameter</li> </ul> </li> </ul>	2

**Continued**

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>b. How to check and adjust tyre pressures and measure tread depths, to include:           <ul style="list-style-type: none"> <li>i. PPE to be used for the task</li> <li>ii. preparing the work area</li> <li>iii. selecting appropriate information for the task</li> <li>iv. appropriate selection and use of tools and equipment</li> <li>v. safe working practices</li> <li>vi. hazards associated with the task</li> <li>vii. how to check and adjust tyre pressures: checking tyre condition, cold tyre, inflation to manufacturer's specification considering vehicle load</li> <li>viii. how to check, measure and record tyre tread depths: where and how often to measure the tyre, understanding measurements taken, minimum tread depth legal limits for the vehicle, how to report findings</li> <li>ix. the importance of leaving the work area in a clean and safe condition</li> </ul> </li> </ul> | 2 |
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# Unit E3AMR14: Introduction to Transmission System Components and Maintenance

**Rationale:** In this unit learners will investigate the main components of transmission systems and carry out simple maintenance checks.

Unit Content	Learning Outcome
<p>Know about transmission systems, to include:</p> <ul style="list-style-type: none"> <li>a. The main transmission system components, to include:               <ul style="list-style-type: none"> <li>i. clutch</li> <li>ii. gearbox</li> <li>iii. driveline including common layouts and associated components</li> </ul> </li> <li>b. Basic function of the transmission system, to include:               <ul style="list-style-type: none"> <li>i. clutch: to provide a means of engaging and disengaging engine torque to the gearbox</li> <li>ii. gearbox: to provide a range of gears for various vehicle operating conditions and a means of multiplying engine torque and transmitting it to the driveline</li> <li>iii. driveline: to turn the direction of drive from the gearbox and transmit torque to the road wheels</li> </ul> </li> <li>c. The simple maintenance procedures, to include:               <ul style="list-style-type: none"> <li>i. PPE to be used for the task</li> <li>ii. preparing the work area</li> <li>iii. selecting appropriate information for the task</li> <li>iv. appropriate selection and use of tools and equipment</li> <li>v. safe working practices</li> <li>vi. hazards associated with the task</li> <li>vii. how to carry out gearbox and final drive oil level checks</li> <li>viii. the importance of leaving the work area in a clean and safe condition</li> </ul> </li> </ul>	<p>1</p>

# Unit E3AMR15: Introduction to Vehicle Lighting System Components and Maintenance

**Rationale:** In this unit learners will investigate the main components of vehicle lighting systems and carry out simple maintenance.

Unit Content	Learning Outcome
<p>Know about vehicle lighting systems, to include:</p> <ul style="list-style-type: none"> <li>a. The main vehicle lighting systems, to include:               <ul style="list-style-type: none"> <li>i. headlamps: dip and main beam</li> <li>ii. side lamps: front and rear including number plate and any side marker lamps</li> <li>iii. indicators including side repeaters</li> <li>iv. brake lamps</li> <li>v. fog lamps: front and rear</li> <li>vi. reverse lamps</li> <li>vii. interior lamps</li> </ul> </li> <li>b. The main lighting system components, to include:               <ul style="list-style-type: none"> <li>i. battery</li> <li>ii. wiring</li> <li>iii. fuse</li> <li>iv. switch</li> <li>v. bulb</li> </ul> </li> <li>c. Basic use of vehicle lighting, to include:               <ul style="list-style-type: none"> <li>i. to provide sufficient lighting so the vehicle driver can see in low light and in poor weather conditions</li> <li>ii. to enable others to see what the driver's intentions are, for example: using indicators when the driver/rider is intending to change direction or brake lamps when the vehicle is slowing or coming to a stand still</li> </ul> </li> <li>d. Basic operation of a vehicle lighting system, to include:               <ul style="list-style-type: none"> <li>i. The flow of electricity from the battery is controlled by a switch; this breaks the circuit and stops the flow of electric current. Closing the switch operates the lamp which causes current to flow through a fine wire filament in the bulb which then glows giving off heat</li> </ul> </li> <li>e. The simple maintenance procedures, to include:               <ul style="list-style-type: none"> <li>i. PPE to be used for the task</li> <li>ii. preparing the work area</li> <li>iii. selecting appropriate information for the task</li> <li>iv. appropriate selection and use of tools and equipment</li> <li>v. safe working practices</li> <li>vi. hazards associated with the task</li> <li>vii. how to remove and refit a headlamp bulb</li> <li>viii. how to carry out an operational test of vehicle lighting</li> <li>ix. how to locate vehicle manufacturer's information for a fuse and light bulb</li> <li>x. the importance of leaving the work area in a clean and safe condition</li> </ul> </li> </ul>	<p>1</p>

## Unit E3AMR16: Introduction to Body Fitting (MET)

**Rationale:** This unit will provide learners with the knowledge and skills in being able to remove and refit vehicle interior door card / trim and supporting systems from a training vehicle or rig.

Learners will use simple diagrams and instruction sheets to identify the correct methods of removal and refitting; this includes mechanical fixings and electrical connections which form part of interior door trims.

Unit Content	Learning Outcome
<p>Know the process of removing and refitting a vehicle interior door card/trim, to include:</p> <ul style="list-style-type: none"> <li>a. Process of removing and refitting an interior door card, to include:               <ul style="list-style-type: none"> <li>i. instructions, sequence and methods</li> <li>ii. simple picture diagrams</li> <li>iii. vehicle protection</li> <li>iv. circuit isolation, disconnecting the battery</li> <li>v. keeping all fixings safe and stored correctly</li> <li>vi. cleanliness through removal and refitting activities</li> </ul> </li> <li>b. Tools/equipment, to include:               <ul style="list-style-type: none"> <li>i. trim removal tools</li> <li>ii. screwdrivers</li> <li>iii. spanners</li> <li>iv. ratchets and sockets</li> <li>v. pliers</li> <li>vi. vehicle protection kits</li> </ul> </li> <li>c. Removal and refitting an interior door card/trim               <ul style="list-style-type: none"> <li>i. techniques to remove mechanical fixings</li> <li>ii. specific use of tools</li> <li>iii. marking and labelling components, connections and wiring</li> <li>iv. techniques in removing electrical connections and switches</li> <li>v. methods used to align interior door cards/trim</li> <li>vi. techniques to minimise damage</li> </ul> </li> <li>d. Safe storage, to include:               <ul style="list-style-type: none"> <li>i. component protection</li> <li>ii. storage boxes</li> <li>iii. appropriate, organised storage areas</li> </ul> </li> </ul>	1

## Unit E3AMR17: Introduction to Minor Dent Removal

**Rationale:** This unit will provide learners with the basic knowledge and skills to remove a minor dent in an A4 size, steel panel using basic hand tools. Learners will also identify alternative ways to rectify minor damage using a range of techniques.

Unit Content	Learning Outcome
<p>Know how to remove a minor dent in a steel panel, to include:</p> <ul style="list-style-type: none"> <li>a. Material/panel identification, to include:               <ul style="list-style-type: none"> <li>i. simple tests and inspection to identify steel panels, such as: appearance, evidence of rust, weight and proves to be magnetic</li> </ul> </li> <li>b. Purpose of and how to use a planishing hammer and dolly, to include:               <ul style="list-style-type: none"> <li>i. shaping metal</li> <li>ii. supporting the panel</li> <li>iii. removing minor damage</li> <li>iv. raising the damaged area</li> <li>v. techniques in using the tools</li> <li>vi. grip position and striking techniques</li> </ul> </li> <li>c. Alternative techniques for repairing minor damage:               <ul style="list-style-type: none"> <li>i. the use of bumping files</li> <li>ii. adjustable body files</li> <li>iii. the use of sight and profile gauges</li> <li>iv. the use of paint material to identify damaged areas</li> </ul> </li> </ul>	1

## Unit E3AMR18: Introduction to Joining Motor Vehicle Materials

**Rationale:** This unit will provide learners with the knowledge and skills to join plastic and steel materials used in vehicle construction. Joining methods include: adhesive and mechanical fixings.

Learners will carry out joining methods on test pieces/coupons or tasks that meet the assessment criteria.

Unit Content	Learning Outcome
<p>Know how to join steel and plastic vehicle components using fasteners, to include:</p> <ul style="list-style-type: none"> <li>a. Common vehicle fasteners, to include:               <ul style="list-style-type: none"> <li>i. pop rivets</li> <li>ii. self-tapping screws</li> <li>iii. single and two pack adhesives</li> </ul> </li> <li>b. Selecting appropriate vehicle fasteners to include:               <ul style="list-style-type: none"> <li>i. consideration of the types of materials to be joined</li> <li>ii. access to prepare and join components</li> <li>iii. loads associated with components</li> <li>iv. application of components, cosmetic, non-structural/structural</li> <li>v. appropriate selection of fixing methods for materials, permanent and non-permanent</li> </ul> </li> <li>c. Using common vehicle fasteners, to include:               <ul style="list-style-type: none"> <li>i. selecting suitable fasteners for the job and materials</li> <li>ii. the correct preparation and use of tools, equipment and materials to be joined</li> <li>iii. following manufacturer's instructions and guidelines</li> <li>iv. checking materials that have been joined are safe and secure, and fit for purpose</li> </ul> </li> <li>d. The processes which are involved in spot welding, to include:               <ul style="list-style-type: none"> <li>i. consulting technical information</li> <li>ii. cleaning the panel surface</li> <li>iii. preparing the surface in accordance with the vehicle manufacturer's instructions and researched repair methods</li> <li>iv. marking out the pitch of the welds</li> <li>v. applying corrosion protection materials</li> <li>vi. setting up the welding equipment</li> <li>vii. adjusting welding equipment</li> <li>viii. carry out spot welding</li> <li>ix. cleaning and dressing spot welds</li> <li>x. shutting down resistance spot welding equipment</li> </ul> </li> </ul>	1

# Unit E3AMR19: Introduction to Mixing, Applying and Shaping Body Filler

**Rationale:** This unit will provide learners with basic knowledge and skills to be able to mix, apply and shape body filler to repair a minor dent (5-10mm in diameter) on a flat, A4 size steel panel.

The learner will use mixing, applying and shaping tools and consumables, whilst following manufacturer's instructions.

Unit Content	Learning Outcome
<p>Know about body filling tools, equipment and consumables, to include:</p> <ul style="list-style-type: none"> <li>a. Identification and the purpose of tools, equipment and consumables, to include:               <ul style="list-style-type: none"> <li>i. range of dust masks suitable for the task</li> <li>ii. spreader – applying body filler</li> <li>iii. appropriate mixing board – a sound surface for mixing body filler and hardener</li> <li>iv. polyester body filler – filling and shaping damage and imperfections in vehicle panels</li> <li>v. hardener – mixes with the body filler and aids the chemical curing process</li> <li>vi. protective sheeting – to cover panels, trim and the work surface</li> </ul> </li> <li>b. Correct set up and selection of tools/equipment, to include:               <ul style="list-style-type: none"> <li>i. selecting a suitable sanding block for the size of the repair</li> <li>ii. connecting the extraction pipe correctly</li> <li>iii. dust extraction unit, checks, operation and cleaning</li> </ul> </li> </ul>	1
<p>Know how to prepare and apply body filler, to include:</p> <ul style="list-style-type: none"> <li>a. Surface preparation, to include:               <ul style="list-style-type: none"> <li>i. cleaning methods</li> <li>ii. abrasive selection and reasons for choices</li> <li>iii. metal and appropriate preparation techniques</li> <li>iv. sanding, abrasives and cleaning</li> <li>v. protecting surfaces</li> </ul> </li> <li>b. Using and applying body filler, to include:               <ul style="list-style-type: none"> <li>i. following manufacturer's instructions</li> <li>ii. accurate ratios between filler and hardener</li> <li>iii. how temperature can affect:                   <ul style="list-style-type: none"> <li>• drying and curing times</li> <li>• mixing ratios of hardener and filler</li> </ul> </li> <li>iv. avoiding contamination when mixing</li> <li>v. time available before the product becomes unusable</li> <li>vi. applying body filler in stages</li> <li>vii. accurate and effective application of body filler</li> <li>viii. cleaning and disposing of resources when the task is finished</li> </ul> </li> </ul>	2



**Continued**

Know how to shape body filler, to include:

- a. Correct selection of abrasives, to include:
  - i. abrasive fixing methods
  - ii. knowing the difference between coarse and fine abrasives
  - iii. correct type of abrasive for use with extraction equipment
  - iv. order of use
  - v. understanding the implications of using the incorrect abrasive
  - vi. a selection of grades suitable for shaping body filler
  
- b. Shaping body filler, to include:
  - i. guide coats
  - ii. correct positioning of block to the panel surface
  - iii. correct motion/sanding technique
  - iv. sanding block selection
  - v. checking the repair visually and by 'feel'
  - vi. determining high and low spots
  - vii. understanding when to apply more than one layer of body filler
  - viii. knowing when the required standard is achieved

3

# Unit E3AMR20: Introduction to Masking Materials and Techniques

**Rationale:** This unit will provide learners with the knowledge and skills required to use basic masking materials and application techniques. On completion of this unit learners will be able to mask out equal sections on an A4 sized steel panel.

Unit Content	Learning Outcome
<p>Know about using masking tape and paper, to include:</p> <ul style="list-style-type: none"> <li>a. Reasons for masking, to include:               <ul style="list-style-type: none"> <li>i. protecting areas from damage during repair and preparation</li> <li>ii. protecting areas from overspray</li> </ul> </li> <li>b. Use of masking materials, to include:               <ul style="list-style-type: none"> <li>i. economical use and how to avoid waste</li> </ul> </li> <li>c. Different techniques used during vehicle masking tasks:               <ul style="list-style-type: none"> <li>i. folding and rolling masking tapes to create a soft edge</li> <li>ii. back masking</li> <li>iii. pulling tape from the roll and lining up edges</li> <li>iv. keeping the tape taut</li> <li>v. smoothing out creases</li> <li>vi. applying pressure and sticking</li> <li>vii. folding, shaping and cutting masking materials</li> <li>viii. spot repair masking</li> <li>ix. methods which promote economic use of materials and avoid waste</li> </ul> </li> </ul>	1
<p>Know the causes of masking faults, to include:</p> <ul style="list-style-type: none"> <li>a. Simple masking faults, to include:               <ul style="list-style-type: none"> <li>i. adhesion issues caused by a dirty or wet surface, incorrect tape storage</li> <li>ii. paint/primer creep caused by the edges of the tape not being pressed to the surface, contaminated tape, contaminated panels and overheating of the tape</li> </ul> </li> </ul>	2

## Unit E3AMR21: Introduction to Applying Aerosol Primers

**Rationale:** This unit will provide learners with the knowledge required to identify etch and high-build primers. Learners will also be able to recognise the specific uses of etch, high-build and plastic primers and develop the skills to apply them in a safe manner.

Unit Content	Learning Outcome
<p>Know about primers, to include:</p> <ul style="list-style-type: none"> <li>a. Primers and their uses, to include:               <ul style="list-style-type: none"> <li>i. state the difference between etch, high-build and plastic primers</li> <li>ii. outline where primers are used and where to locate paint application information</li> </ul> </li> </ul>	1
<p>Know how to use aerosol primers, to include:</p> <ul style="list-style-type: none"> <li>a. The purpose of tools:               <ul style="list-style-type: none"> <li>i. sanding blocks - rubber and extracted</li> </ul> </li> <li>b. The purpose of equipment:               <ul style="list-style-type: none"> <li>i. extraction equipment/units</li> <li>ii. degreaser dispensers</li> <li>iii. paper/towel dispensers</li> </ul> </li> <li>c. The purpose of consumables:               <ul style="list-style-type: none"> <li>i. cleaning/degreaser materials</li> <li>ii. wipes</li> <li>iii. guide coat</li> <li>iv. abrasives and their method of fixing</li> </ul> </li> <li>d. Abrasive grades and types, to include:               <ul style="list-style-type: none"> <li>i. wet and dry</li> <li>ii. grades of abrasive suitable for the task</li> <li>iii. paint manufacturer's information / instructions</li> </ul> </li> <li>e. Preparing aerosols for use, to include:               <ul style="list-style-type: none"> <li>i. consulting manufacturer's instructions</li> <li>ii. mixing 'shaking'</li> <li>iii. checking and locating the nozzle</li> <li>iv. fan adjustment if applicable</li> </ul> </li> <li>f. Primer preparation to accept top coat, to include:               <ul style="list-style-type: none"> <li>i. paint manufacturer's information/instructions</li> <li>ii. the purpose and use of guide coat</li> <li>iii. the preparation process of aerosol applied primer</li> <li>iv. sanding techniques to aid the preparation process</li> <li>v. successful cleaning</li> <li>vi. assessing the standard of the preparation</li> </ul> </li> <li>g. Safe disposal of used aerosol cans, to include:               <ul style="list-style-type: none"> <li>i. following paint manufacturer's instructions</li> <li>ii. reasons why recycling is important</li> </ul> </li> </ul>	2

## Unit E3AMR22: Introduction to Preparing and Applying Aerosol Top Coats

**Rationale:** This unit will enable learners to develop the knowledge and skills to prepare a high-build aerosol primer to accept a top coat. The area of preparation is an A4 sized steel panel and will be prepared using hand sanding methods. Learners will also apply both 1k and 2k aerosols using direct gloss and metallic coatings.

Learners will follow manufacturer's instructions and use appropriate abrasives, guide coats and cleaning materials during application of the aerosol top coat process.

Unit Content	Learning Outcome
Know about abrasives and guide coats for successful preparation, to include: <ol style="list-style-type: none"> <li>a. Abrasive grades and types, to include:               <ol style="list-style-type: none"> <li>i. wet and dry</li> <li>ii. grades of abrasive suitable for this task</li> <li>iii. paint manufacturer's information/instructions</li> <li>iv. purpose of guide coat</li> </ol> </li> </ol>	1
Know how to clean surfaces before applying top coats, to include: <ol style="list-style-type: none"> <li>a. Cleaning products to include:               <ol style="list-style-type: none"> <li>i. water-based and solvent cleaners</li> <li>ii. suitable wipes/cloth</li> <li>iii. tack rags</li> <li>iv. safe use of uncontaminated compressed air</li> </ol> </li> <li>b. Using cleaning materials prior to applying top coats, to include:               <ol style="list-style-type: none"> <li>i. techniques in cleaning, changing cloths before they are contaminated</li> <li>ii. how to apply cleaners</li> <li>iii. cleaning agent dispensers</li> <li>iv. removal of cleaning products from the panel surface</li> <li>v. tack rag use</li> </ol> </li> </ol>	2
Know how to apply aerosol direct gloss and metallic top coats, to include: <ol style="list-style-type: none"> <li>a. The process of applying aerosol top coat, to include:               <ol style="list-style-type: none"> <li>i. 1k and 2k aerosol types</li> <li>ii. correct technique: paint thickness, number of coats, coverage, distance from the panel, overlap, spray pattern (if appropriate) and nozzle/cap pressure</li> <li>iii. method of applying a first coat</li> <li>iv. flash-off period</li> <li>v. method of applying second coat</li> <li>vi. application of basecoats and clear</li> <li>vii. laydown of metallic coatings</li> </ol> </li> <li>b. Drying method aerosol top coats to include:               <ol style="list-style-type: none"> <li>i. air drying and appropriate force drying</li> </ol> </li> </ol>	3

**Continued**

- c. Techniques to avoid paint faults during the application of aerosol top coat, to include:
  - i. locating manufacturer's instructions/guidelines
  - ii. nozzle/cap – cleanliness, cleaning and removal
  - iii. even nozzle/cap pressure
  - iv. distance from the panel
  - v. number of coats
  - vi. amount of paint applied
  - vii. inconsistent overlap
  
- d. 'Flash-off periods' possible common paint faults, to include:
  - i. drips, runs, sags, dirt inclusions
  - ii. 'paint spatter'
  
- e. Drying methods of aerosol top coats, to include:
  - i. air-drying
  - ii. consequences of force drying and overheating aerosol top coats

3