

**Course:** **A Practical Approach to Basic Automotive Maintenance**

**Guided Learning Hours:** **18 hours**

**Pre-requisite:** **None**

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### **Abstract**

This unit was designed for the personal vehicle owner or beginner will provide the technical and practical knowledge required to carry out routine maintenance of vehicles. Emphasis will be placed on simple DIY tasks which can be easily undertaken to ensure the vehicle is in good operating condition. A properly maintained vehicle will serve you well, save you money in repairs in the future, and significantly increase its resale value

In order to ensure that the learner fully understands the concepts relating to automotive maintenance, the course content was structured to maximize the contact hours allocated for practical work. Currently 80% of the course involves hands on, practical training.

This unit will focus on the basic principles of engine theory, starting and charging systems, cooling and lubrication systems, braking systems and vehicle electronics. Practical activities will involve routine maintenance checks incorporating inspection and replacement of worn components.

### **Target Audience**

This course is ideally suited for first time car owners or anyone who wants to learn the basics of routine automotive maintenance and/or wishes to develop a foundation for further study in automotive maintenance.

### **Learning outcomes**

On completion of this course, learners will be able to:

1. Inspect and carry out repairs on a vehicle's lubricating and cooling system
2. Inspect and carry out repairs on a vehicle's braking system
3. Inspect and carry out repairs a vehicle's electrical system
4. Understand and practice basic auto care

## Course Content

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### 1. Inspect and carry out repairs on a vehicle's lubricating and cooling systems

*Lubricating System:* Principles of engine lubrication systems (overview, layout); Identify and state the function of the following components: Oil pan and pump, filter and strainers, sensors, pressure gauges and relief valves, coolers, crankcase ventilation; Types of lubricants and their properties (viscosity, pour point, flash point).

*Maintenance of lubricating system:* Checking oil levels, lubrication selection, filter removal and replacement, lubricant refilling, waste disposal.

*Cooling System:* Operating principles of vehicle cooling systems; Identify and state the function of the following components: radiator, hoses, pressure caps, thermostat, fans, temperature sensors, control valves; Use of antifreeze and corrosion inhibitors.

*Maintenance of cooling systems:* Checking water levels in radiator, flushing radiator, refilling of coolant, inspecting hoses for wear, pressure testing system for leaks.

### 2. Inspect and carry out repairs on a vehicle's braking system

*Tyres:* Identify and explain the markings on tyres (speed rating, direction of rotation, load handling and ply rating, pressure, tread wear indicators), Identify different types of wheel and rim construction (Steel wheels, alloy wheels); Identify various methods of tire construction (tubed and tubeless, radial, bias belted); Benefits of tyre rotation, balancing and alignment.

*Tyre maintenance:* Checking tyre pressure, Inspecting wear patterns and tread depths, safely changing a flat tire.

*Braking System:* Identify and explain the operation of disc and drum brake systems; Identify and state the function of the following components: hydraulic cylinders and calipers, discs and drums, brake pads and shoes, brake fluid; Explain the function of antilock braking.

*Maintenance of braking systems:* Inspecting and replacing worn brake pads and shoes; Inspecting brake fluid levels.

### **3. Inspect and carry out repairs on a vehicle's electrical system**

*Electrical System:* Identify and state the function of the following components: Battery and charging system (lead acid battery, alternator), Engine starting system (starter motor, ignition switch), Lighting systems (exterior and interior lights and bulbs); Types of batteries (sealed and non-sealed); Types of fuses.

*Maintenance of electrical system:* checking battery charge and alternator charging voltage, Replacing a dead battery, jump starting a vehicle (using jumper cables, battery charger, swapping batteries), changing blown bulbs (headlights, indicator lights, stop lights/tail lights), Inspecting and replacing blown fuses.

### **4. Understand and practice basic auto care**

*Vehicle Detailing:* Types of cleaning products and their application; Restoring paint finishes (polishing and waxing), Removal of minor scratches; Cleaning and restoration of headlights.

*Additional auto care maintenance:* Procedure for changing worn wiper blades; Replacing air filters (engine air intake, air conditioner blower);

## Assessment Criteria

In order to achieve Learning Outcome...	The Learner must...
1     Inspect and carry out repairs on a vehicle's lubricating and cooling systems	<ul style="list-style-type: none"><li>1.1 Identify and state the function of various components related to the lubrication system in a vehicle.</li><li>1.2 Select the correct type of lubricant for a particular application and vehicle model.</li><li>1.3 Demonstrate the ability to check engine oil levels.</li><li>1.4 Demonstrate the ability to safely change the engine oil and filter.</li><li>1.5 Identify and state the function of various components related to the cooling system in a vehicle.</li><li>1.6 Demonstrate the ability to check coolant levels and refill coolant when required.</li><li>1.7 Demonstrate the ability to perform a quick pressure test of the system to check for leaks.</li></ul>
2     Inspect and carry out repairs on a vehicle's braking system	<ul style="list-style-type: none"><li>2.1 Identify and explain the performance ratings of tyres.</li><li>2.2 Identify and explain the operation of various types of braking systems.</li><li>2.3 Identify and state the function of various components related to the braking system in a vehicle.</li><li>2.4 Select the correct type of brake fluid for a particular vehicle.</li><li>2.5 Demonstrate the ability to accurately check tyre pressure and inflate a "soft" tyre to the correct pressure.</li><li>2.6 Demonstrate the ability to safely change a flat type.</li><li>2.7 Demonstrate the ability to safely replace worn brake pads and brake shoes.</li></ul>

3    Inspect and carry out repairs on a vehicle's electrical system	3.1    Identify and state the function of various components related to the battery and charging system in a vehicle. 3.2    Select the correct type of battery for a particular vehicle. 3.3    Demonstrate the ability to safely "jump start" a vehicle. 3.4    Demonstrate the ability to replace a dead battery. 3.5    Demonstrate the ability to use a multi-meter to check battery charge and test the functionality of the charging system of the vehicle. 3.6    Demonstrate the ability to replace blown bulbs and fuses.
4    Understand and practice basic auto care	4.1    Select the proper product for use in cleaning various surfaces: windshield (glass), body (painted), lights (plastic), dashboard (vinyl, composite material), seats (fabric, leather) 4.2    Demonstrate the ability to replace worn wiper blades 4.3    Demonstrate the ability to replace all air filters.

### Essential Learning Resources:

Learners will have access to a fully equipped automotive workshop to carry out the various maintenance tasks.

### Textbooks and Manuals

1. Idiot's Guides: Auto Repair and Maintenance  
ISBN-13: 978-1615647620
2. Owner's manuals (various vehicle models)