Curriculum for Automobile Mechanic
(1 Year)
Contents

Overall objectives of the course.................................................. 3
   Competencies gained after completion of the course.............. 3
   Job opportunities available immediately and in the future..... 3
   Entry level.............................................................................. 4
   Grade...................................................................................... 4

Overview about the program..................................................... 5

Automobile Mechanic curriculum contents........................... 7
   Module 1: Automotive Workshop Basics ............................. 7
   Module 2: Diagnosing and Servicing the Engine ............... 9
   Module 3: Service of Power Train ...................................... 13
   Module 4: Servicing Chassis Systems ................................. 15
   Module 5: Servicing Automotive Electrical ....................... 17
   Module 6: Application of Related Studies ......................... 18

Assessment ............................................................................... 20
   Module 1: Automotive Workshop Basics ............................. 20
   Module 2: Diagnosing and Servicing the Engine ............... 22
   Module 3: Service of Power Train ...................................... 26
   Module 4: Servicing Chassis Systems ................................. 28
   Module 5: Servicing Automotive Electrical ....................... 29
   Module 6: Application of Related Studies ......................... 30

Supportive notes....................................................................... 32
   Assessment context.............................................................. 32
   Critical aspects...................................................................... 32
   Assessment condition.......................................................... 33
   Special notes......................................................................... 34
   Resources required.............................................................. 34
Overall Objectives of the Course

(i) The learner will be able to work as a semi skilled worker.
(ii) Fulfill the job requirements for an employer.
(iii) Facilitate new entrants to learn and enter the labor market.
(iv) Improve the workmanship of existing workers.

Competencies Gained after Completion of Course

- To apply safety precautions.
- Select use and handle automotive, hand tools, workshop tools, safely and efficiently.
- Identify and use automotive fasteners.
- Tune up the car.
- Diagnose and service the engine.
- Diagnose and service of fuel (Petrol, Diesel, E.F.I., and C.N.G.), lubricating, cooling, ignition, emission and exhaust systems.
- Diagnose and service the power train components as clutch, transmission, drive shaft, differential and axles.
- Diagnose and service the suspension, steering and brake systems.
- Replace battery, self starter and alternator.
- Do minor repair work of car wiring such as replacing fuses, bulbs and horns etc.
- Recheck the work done.

Job Opportunities Available Immediately and in the Future

- Pass out may be employed in following sectors.
- Car Workshops
- Car Dealerships
- Heavy Duty Workshops
- Private fleets and garages
- Government departments
- Assembly plants
- Generator workshops
- Spare parts stores.
- Self Business.
Learners can also progress to get admission in a 2 year course aimed at producing skilled workers i.e. Head Technician and Forman.

**Entry Level**

(i) Minimum Middle  
(ii) Preferably Matric

**Grading**

<table>
<thead>
<tr>
<th>Grading</th>
<th>Theory: Pass marks</th>
<th>40%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Practical: Pass marks</td>
<td>60%</td>
</tr>
<tr>
<td>Fail</td>
<td>0 – 59%</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>60 – 78%</td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>79 – 92%</td>
<td></td>
</tr>
<tr>
<td>V. Good</td>
<td>93 – 100%</td>
<td></td>
</tr>
</tbody>
</table>
# Overview about the program – Curriculum for Automobile Mechanic

<table>
<thead>
<tr>
<th>Module Title and Aim</th>
<th>Learning Units</th>
<th>Theory hours</th>
<th>Workplace hours</th>
</tr>
</thead>
</table>
| **Module 1: Automotive Workshop Basics** | **Aim:** Behave as a good automotive technician, use the tools, fasteners safely and efficiently.  
Apply:  
1.1 Safety Precautions  
1.2 Measuring tools  
1.3 Fasteners, sealants and cleaning liquids.  
1.4 Automotive hand tools  
1.5 Workshop tools  
1.6 Behave safely in workshop | 22 | 72 |
| **Module 2: Diagnosing and Servicing the Engine** | **Aim:** Perform maintenance, diagnosis and service work on engine efficiently.  
Service the:  
2.1 Engine  
2.2 Fuel Systems  
2.3 Lubrication Systems  
2.4 Cooling Systems  
2.5 Ignition Systems  
2.6 Exhaust Systems. | 115 | 602 |
| **Module 3: Service of Power Trains** | **Aim:** Diagnose and service the power train components amicably.  
Service the:  
3.1 Clutch Systems  
3.2 Transmission and Transaxles  
3.3 Propeller Shaft.  
3.4 Differentials  
3.5 Axles | 40 | 204 |
<p>| <strong>Module 4: Servicing Chassis Systems</strong> | <strong>Aim:</strong> | 69 | 272 |</p>
<table>
<thead>
<tr>
<th>Aim: Diagnose and repair the chassis systems efficiently.</th>
<th>4.2 Steering Systems</th>
<th>4.3 Brake Systems</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Module 5: Basic Electrical Systems</strong></td>
<td>Maintenance and service of the:</td>
<td>20</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aim: Perform basic electrical tasks required for an engine technician</td>
<td>5.1 Battery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.2 Self Starter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.3 Charging Systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.4 Electrical Components</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Module 6: Application of Related Studies</strong></td>
<td>6.1 Solve mathematical problems</td>
<td>54</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aim:</td>
<td>6.2 Sketch out technical drawing (Basic / related.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Apply simple mathematical rules important in the workshop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Explain construction and function of components of various automotive systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL HOURS</strong></td>
<td>320</td>
<td>1280</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Auto Mechanic Curriculum Contents (Teaching and Learning Guide)

## Module 1 Title: Automotive Workshop Basics

**Objective of the Module:** Behave as a good automotive technician, use the tools, fasteners safely and efficiently.

**Duration:** 94 hours  
**Theory:** 22 hours  
**Practice:** 72 hours

<table>
<thead>
<tr>
<th>Learning Unit</th>
<th>Learning Outcomes</th>
<th>Learning Elements</th>
<th>Duration</th>
<th>Materials/ Tools Required</th>
<th>Learning Place</th>
</tr>
</thead>
</table>
| 1.1 Apply the safety precautions | To adopt safety measures, personally, for the tools, job and environment | - Describe personal safety  
   Tools and machine safety  
   - Job safety  
   - Environment safety  
   - Demonstrate proper use of the fire extinguishers | 6 Hrs | • Fire extinguishers  
   • Vehicle | Class room and Institute workshop |
| 1.2 Measuring | To measure precisely and to compare with standard size | Explain:  
   - Measure units of mass, volume, length and time in Imperial/Metric System  
   - Measure units in metric system  
   - Identify and use with:  
     • Steel rules  
     • Vernier Caliper  
     • Micrometer  
     • Dial Gauge | 20 Hrs | • Steel foot rule  
   • Vernier Caliper  
   • Micrometer  
   • Dial Gauge  
   • V – Blocks  
   • Required Tools | Measuring Lab |
| 1.3 Use of Fasteners and Sealants | To identify and use fasteners and sealants | - Define fastener and its types  
   - Identify automotive fasteners and locking devices  
   - Use of Circlips  
   - Select and use of sealants  
   - Explain purpose and materials of Gaskets  
   - Identify Gaskets and “O” rings  
   - Removing of broken studs/bolts | 14 Hrs | • Various Types of Fasteners  
   • Torque Wrench  
   • Gaskets  
   • Sealants | Class room and Institute workshop |
| 1.4 Use of Hand Tools | Select use and handle the hand tools properly | - Identify and use fitting tools  
   ➢ Screw Drivers  
   ➢ Spanners  
   ➢ Socket Set  
   ➢ Allen Key  
   ➢ Adjustable Wrench | 39 Hrs | • General Mechanic Tool Kit | Institute workshop |
<table>
<thead>
<tr>
<th>1.5 Use of workshop tools</th>
<th>Identify and use the workshop equipment efficiently and safely</th>
<th>Identify and use the Bench Vise</th>
<th>9 Hrs</th>
<th>Workshop Tools as in Column 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Identify and use the electric tools</td>
<td>- Drill Machine</td>
<td></td>
<td>Class room and Institute workshop</td>
</tr>
<tr>
<td></td>
<td>- Bench Grinder</td>
<td>- Air Compressor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Jacks and Lifts</td>
<td>- Arbor and Hydraulic Press</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Washer Tanks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.6 Behave professionally in automotive workshop</td>
<td>Behave professionally in the workshop</td>
<td>Behave professionally</td>
<td>6 Hrs</td>
<td>Class room</td>
</tr>
<tr>
<td></td>
<td>- Display good attitude with colleagues and customers</td>
<td>- Display good attitude to the work at hand</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Module 2 Title:** Diagnosing and Servicing the Engine  
**Objective of the Module:** Perform maintenance, diagnosis and service work on engine efficiently  
**Duration:** 717 hours  
**Theory:** 115 hours  
**Practice:** 602 hours

<table>
<thead>
<tr>
<th>Learning Unit</th>
<th>Learning Outcomes</th>
<th>Learning Elements</th>
<th>Duration</th>
<th>Materials Required</th>
<th>Learning Place</th>
</tr>
</thead>
</table>
| 2.1 Diagnose and Service Engine | - Learner will be able to explain the working of an engine.  
- Identify Engine components  
- Dismantle, check and assemble engine. | Explain:  
- Engine and its types  
- 4 stroke petrol engine working.  
- 2 stroke petrol engine working  
- Working of diesel engine.  
- Spark Ignition Engine  
- Describe construction and function of:  
  ➢ Cylinder heads  
  ➢ Valve mechanisms  
  ➢ Cylinder blocks  
  ➢ Piston, piston rings and pins  
  ➢ Connecting rod and big end bearings  
  ➢ Crank shaft and main journal bearings  
  ➢ Fly wheels  
- Remove the engine from the car  
- Dismantle the engine  
- Inspect and check the engine parts  
- Engine timing (valve and ignition)  
- Assemble the engine  
- Adjusting tappet clearance  
- Fit the engine in the car  
- Start the engine  
- Perform Compression test | 282 Hrs |  
- General mechanics tool kit  
- Lifting equipment  
- Torque wrench  
- Bench Vice  
- Valve seat cutter/Lapping stick  
- Micrometer  
- Vernier calipers  
- Pullers of different size  
- Straight edge.  
- Valve spring compressor  
- Valve spring tester  
- Cotton Waste  
- Kerosene oil  
- Compression gauge/tester  
- Cleaning equipment  
- Hydraulic press  
- Engine oil and grease  
- Diesel and petrol fuel  
- Metal pans for cleaning tray. | Class Room and institute workshop |
| 2.2 Diagnose and Service Fuel Systems | Learner will be able to identify, service and repair the fuel systems:  
- Carburetor E.F.I.  
- C.N.G.  
- Diesel fuel injection | - Describe the purpose of a fuel system  
- Describe Air fuel ratios  
- Describe construction, function and operation of fuel systems  
  ➢ Fuel tank  
  ➢ Fuel pumps  
  ➢ Fuel and air filters  
  ➢ Thermostatic air cleaner  
  ➢ Carburetor circuits and attachments  
  ➢ Fuel gauges | 283 Hrs |  
- General mechanic tools kit  
- Lifting equipment  
- Fuel pressure gauge  
- Torque wrench  
- Oscilloscope multi meter  
- Computer lead box diagnosis systems and interface box  
- Tachometer | Class room / Institutional workshop and auto mobile workshop |
<table>
<thead>
<tr>
<th>2.3 Diagnose and service the lubricating</th>
<th>Trainee will be able to diagnose and repair the</th>
<th>- Explain the purpose, construction and working of an engine lubricating systems</th>
<th>16 Hrs</th>
<th>General mechanic tool kit</th>
<th>Oil filter wrench</th>
<th>Sealant</th>
<th>Class room / Institutional workshop and</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Cleaning equipment</td>
<td>- Test lamp</td>
<td>- Bench vice</td>
<td>- Scan tools</td>
<td>- Exhaust gas analyzer</td>
<td>- Special tools as per manufacturer's recommendations</td>
<td>- Compressed air</td>
<td></td>
</tr>
</tbody>
</table>
| systems | lubricating system | - Service oil pumps  
- Checking oil pressure  
- Diagnose Troubles | - Lifting equipment  
- Scarper  
- Oil funnel  
- Recommended oil  
- Waste oil drum | auto mobile workshop |
|---|---|---|---|---|
| **2.4 Diagnose and Service of Cooling Systems** | Trainee will be able to diagnose and repair the cooling system | - Explain the purpose, construction and working of engine cooling systems  
- Describe the function of radiator cap  
- Check/ test radiator cap  
- Test the thermostat valve  
- Adjust the fan belt  
- Replace the water pump  
- Replace the hose pipe  
- Diagnose for problems | - General mechanic tool kit  
- Multi meter  
- Radiator cap tester  
- Temperature gauge  
- Hoses  
- Clamps | Class room / Institutional workshop |
| **2.5 Diagnose and Service of Ignition systems** | Trainee will be able to diagnose and service the ignition system | - Explain the purpose, construction and operation of ignition systems (battery, ignition switch, blast resistance, ignition coil, distributor and spark plugs)  
- Explain spark plugs types  
- Testing spark  
- Replace C.B. Point  
- Test ignition coil  
- Service of spark plugs  
- Setting of ignition timing  
- Use ignition timing light  
- Use dwell angle tester  
- Diagnose for problems  
- Explain pick up coil ignition, high energy ignition, hall effect switch, optical photodiode distributor, multiple coil distributor less ignition, crank and cam position sensor, direct multiple coil ignition, direct capacitor and discharge ignition.  
- Triggering test  
- Retrieve ignition system troubles  
- Test with a breakout box  
- Check air gap of pick up coil ignition  
- Test pick up coil, hall effect switch  
- Check ignition module | - Test lamp  
- Engine analyzer  
- Dwell / tacho meter  
- Condenser Tester  
- Spark plug deep socket set  
- Insulation tester  
- General mechanic tool kit  
- Timing light  
- Plug cleaner and tester  
- Hand vacuum pump  
- Soldering iron  
- **SPARES**  
  - Condensers  
  - C.B. Points  
  - High tension cables  
  - Spark plugs  
- **INSTRUCTIONAL DATA**  
  - Manufacturer’s manuals  
  - Equipment operational manuals  
  - Drawings  
  - Circuit diagrams | Class room / Institutional workshop and auto mobile workshop |
| 2.6 Service and diagnose the emission control systems | Trainee will be able to diagnose and repair the P.C.V. system | - Introduction of emission control systems  
- Explain positive crank case ventilation (P.C.V), evaporative control emission, exhaust gas recirculation, and Catalytic converters.  
- Service of P.C.V. systems  
- Service thermostatic air cleaner  
- Explain safety precautions of catalytic converter | 15 Hrs | ● General mechanic tool kit | Class room / Institutional workshop and auto mobile workshop |
|---|---|---|---|---|
| 2.7 Service of Exhaust system | Trainee will be able to diagnose and replace the Exhaust system parts | - Explain the purpose and construction of exhaust systems  
- Service exhaust systems | 20 Hrs | ● General mechanic tool kit | Class room / Institutional workshop and auto mobile workshop |
Module 3 Title: Service of Power Train  
Objective of the Module: Diagnose and service the power train components amicably  
Duration: 244 hours  Theory: 40 hours  Practice: 204 hours

<table>
<thead>
<tr>
<th>Learning Unit</th>
<th>Learning Outcomes</th>
<th>Learning Elements</th>
<th>Duration</th>
<th>Materials Required</th>
<th>Learning Place</th>
</tr>
</thead>
</table>
| 3.1 Diagnose and Service the Clutch Systems | Trainee will be able to diagnose and service the clutch system | - Explain the purpose, construction and operation of a clutch  
- Explain the types of clutch  
- Explain the clutch linkages  
- Remove, check and reinstall the clutch assembly  
- Clutch master cylinder service and bleeding  
- Adjust clutch pedal free play  
- Trouble shooting. | 59 Hrs | Mechanic's tool kit  
Clutch aligning tool  
Emery paper  
Grease  
Clutch plate  
Pressure plate  
Thrust bearing  
Clutch cable  
Brake oil  
Steel rule  
Fly wheel | Class room / Institutional workshop and auto mobile workshop |
| 3.2 Diagnose and service of Transmission and transaxle | Trainee will be able to diagnose and repair the transmission & transaxle system | Explain:  
- Define gear ratio  
- Purpose, construction and function of 4 speed synchromesh gearbox / transaxle  
- Introduction to automatic gears  
- Remove input shaft, output shaft assembly and countershaft  
- Checking and inspection of parts  
- Reassembly  
- Trouble shooting | 88 Hrs | Mechanic's tool kit  
Transmission oil  
Pan for dismantling  
Transmission/Transaxle | Class room / Institutional workshop and auto mobile workshop |
| 3.3 Service the drive line | Trainee will be able to check & service the drive line | Explain:  
- The purpose of a propeller shaft  
- Construction and function of universal joint and slip joints  
- Remove, check and install a propeller shaft  
- Trouble shooting | 29 Hrs | Mechanics tool kit  
Jacks and stands  
Dial indicator with magnetic stand  
V-Block | Class room / Institutional workshop and auto mobile workshop |
| 3.4 Diagnose & service the differential and axle assembly | Trainee will be able to check & service differential and axle assembly | Describe:  
- The purpose, function and construction of differential and axles (rear and front)  
- Remove, dismantle, check and assemble the differential  
- Adjust back lash  
- Remove, check and refit front drive axle  
- Refit front drive axle  
- Adjust wheel bearings  
- Trouble shooting | 68 Hrs |  
- Mechanic's tool kit  
- Shims, Bearing  
- Differential oil  
- Boot & boot-clips  
- Grease (silicon base)  
- Sealant & Gaskets  
- Cleaning liquids  
- Oil seals  
- Jack & stands  
- Rags | Class room / Institutional workshop and auto mobile workshop |
### Module 4 Title: Servicing Chassis Systems

**Objective of the Module:** Diagnose and repair of chassis systems efficiently

**Duration:** 341 hours  **Theory:** 69 hours  **Practice:** 272 hours

<table>
<thead>
<tr>
<th>Learning Unit</th>
<th>Learning Outcomes</th>
<th>Learning Elements</th>
<th>Duration</th>
<th>Materials Required</th>
<th>Learning Place</th>
</tr>
</thead>
</table>
| **4.1 Diagnose and Service the suspension system** | Trainee will be able to diagnose and service the suspension systems | - Explain the purpose of suspension systems  
- Explain the types of suspension system  
- Check and replace shock absorbers/refill  
- Remove and refit leaf springs  
- Remove and refit of Mc-Pherson struts | 46 Hrs | - Mechanics tool kit  
- Garage Jacks  
- Trolley Jack  
- Coil spring compressor  
- Safety stands | Class room / Institutional workshop and auto mobile workshop |
| **4.2 Diagnose and Service the steering systems** | Trainee will be able to diagnose and service the steering systems | - Explain:  
- The purpose, construction and types of steering systems (Mechanical & Power)  
- The steering linkages  
- Explain wheel balance and steering geometry  
- Service steering gear boxes  
- Adjust steering wheel free plate  
- Check and replace the tie rods  
- Wheel balance  
- Check Toe in camber, caster, steering axis inclination (S.A.I) toe-in & toe-out on turn  
- Adjust angles  
- Trouble shooting | 175 Hrs | - Mechanics tool kit  
- Garage Jacks  
- Safety stands  
- Wheel balancing machine  
- Wheel alignment equipment | Class room / Institutional workshop and auto mobile workshop |
| **4.3 Diagnose and Service the brake system** | Trainee will be able to diagnose and service the brake systems | - Explain the purpose of brakes  
- Describe the construction, function & types of brakes  
- Explain the function of parking brakes  
- Replace and adjust the brake shoes  
- Check and replace the disc pads  
- Check the brake servo unit  
- Service the master cylinders | 120 Hrs | - Mechanics tool kit  
- Vehicle Lifting Jacks & Safety stands  
**MATERIALS**  
- Brake oil  
- Grease  
- Repair kits (Master and wheel) | Class room / Institutional workshop and auto mobile workshop |
<table>
<thead>
<tr>
<th>- Service the wheel cylinder</th>
<th>- Bleeding the brakes</th>
<th>- Adjust parking brakes</th>
<th>- Trouble shooting</th>
<th>- Brake pads</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Brake shoes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Brake hoses and pipes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Vinyl tube and container</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Emery paper</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>cylinder)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Vinyl tube and container</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Emery paper</td>
</tr>
</tbody>
</table>
### Module 5 Title: Servicing Automotive Electrical Components

**Objective of the Module:** Perform important electrical tasks required for an engine technician

**Duration:** 90 hours  **Theory:** 20 hours  **Practice:** 70 hours

<table>
<thead>
<tr>
<th>Learning Unit</th>
<th>Learning Outcomes</th>
<th>Learning Elements</th>
<th>Duration</th>
<th>Materials Required</th>
<th>Learning Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1 Maintenance of the automotive electrical</td>
<td>Trainee will be able to perform maintenance of the</td>
<td>- Describe conductor and insulator&lt;br&gt;- Explain ampere, volt, and resistance&lt;br&gt;- Explain series and parallel circuits&lt;br&gt;- Explain magnet and magnetism&lt;br&gt;- Explain the purpose and function of &lt;br&gt;  - Battery&lt;br&gt;  - Self starter&lt;br&gt;  - Alternator&lt;br&gt;- Connect resistances in series and parallel circuits &lt;br&gt;- Use volt meter and ampere meter&lt;br&gt;- Use of ohm meter&lt;br&gt;- Perform battery maintenance&lt;br&gt;- Cranking motor wiring circuit&lt;br&gt;- Remove and reinstall battery, alternator and self-starter&lt;br&gt;- Replace fuses and bulbs</td>
<td>90 Hrs</td>
<td>- Auto wire&lt;br&gt;- Thimble&lt;br&gt;- Thimble plier&lt;br&gt;- Ampere meter, volt meter, Multi meter&lt;br&gt;- Bulbs and holders&lt;br&gt;- Soldering iron, paste and wire&lt;br&gt;- Hydrometer&lt;br&gt;- Battery charger&lt;br&gt;- Distilled water&lt;br&gt;- Insulation tapes&lt;br&gt;- Lamp tester&lt;br&gt;- Battery clamps&lt;br&gt;- Battery service kit&lt;br&gt;- Mechanic tool kit</td>
<td>Class room / Institutional workshop and auto mobile workshop</td>
</tr>
</tbody>
</table>
Module 6 Title: Application of Related Studies (Technical Maths & Drawing)

Objective of the Module:
1. Apply simple mathematical rules important in workshop
2. Explain construction and function of components of various automotive systems

Duration: 114 hours  Theory: 54 hours  Practice: 60 hours

<table>
<thead>
<tr>
<th>Learning Unit</th>
<th>Learning Outcomes</th>
<th>Learning Elements</th>
<th>Duration</th>
<th>Materials Required</th>
<th>Learning Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Mathematics</td>
<td>Trainee will be able to solve mathematical problems</td>
<td>Calculate</td>
<td>40 Hrs</td>
<td>• Technical Mathematics Book</td>
<td>Class Room</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Addition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Subtraction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Multiplication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Division</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Fractions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Decimals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Percentage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.2 Technical</td>
<td>Trainee will be able to identify and sketch out the construction and function</td>
<td>- Define types of lines, dimensions and lettering</td>
<td>74 Hrs</td>
<td>• Technical Drawing Book</td>
<td>Class Room</td>
</tr>
<tr>
<td>drawing</td>
<td>of components of Automotive systems.</td>
<td>- Define three views</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Define full section and half section</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Complete the sketch/block/circuit diagram of the following:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 4 stroke engine operation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 2 stroke engine operation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Lubrication flow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Coolant circulation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Working of fuel pumps</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Working of carburetors (Idle/High speed circuit)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Battery coil ignition (Circuit diagram)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Electronic ignition (Circuit diagram)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Clutch function (Engage and disengage position)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 4 speed synchronmesh transmission (Power flow in different gears)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Differential function on turn</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Brake Master cylinder working (Tendum, single)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Brake shoe assembly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Steering linkages (Label the diagram)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Wheel alignment angles (Sketch)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Series and parallel circuits (complete the circuit)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Cranking motor circuit (complete the circuit)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Charging circuit (complete the circuit)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Assessment

## Module 1: Automotive Workshop Basics

<table>
<thead>
<tr>
<th>Learning Units</th>
<th>Theory hours</th>
<th>Workplace hours</th>
<th>Recommended formative assessment</th>
<th>Recommended Methodology</th>
<th>Scheduled Dates</th>
</tr>
</thead>
</table>
| 1.1 Apply safety precautions | 3 | 3 | - Describe personal safety  
- Tools and machine safety  
- Job safety  
- Environment safety  
- Demonstrate proper use of the fire extinguishers | • Observation  
• Oral Questions | |
| 1.2 Measuring | 5 | 15 | Explain:  
- Measure units of mass, volume, length and time in Imperial/Metric System  
- Measure units in metric system  
- Identify and use with:  
  • Steel rules  
  • Vernier Caliper  
  • Micrometer  
  • Dial Gauge | • Question Paper  
• Measuring Job | |
| 1.3 Use of Fasteners, Sealants and Gaskets | 4 | 10 | - Define fastener and its types  
- Identify automotive fasteners  
- Use of Circlips  
- Select and use of sealants  
- Explain purpose and materials of Gaskets  
- Identify Gaskets and "O" rings  
- Removing of broken studs/bolts | • Oral questions  
• Checking the Job  
• Oral Questions  
• Checking Measurement  
• Fitting  
• Use | |
| 1.4 Use of Hand Tools | 5 | 34 | - Identify and use fitting tools  
  ➢ Screw Drivers  
  ➢ Spanners  
  ➢ Socket Set  
  ➢ Allen Key  
  ➢ Adjustable Wrench  
  ➢ Torque Wrench  
- Identify and use striking tools  
  ➢ Hammers  
  ➢ Punches | • Questioning  
• Demonstration | |
<table>
<thead>
<tr>
<th></th>
<th>Identify and use pliers</th>
<th>Identify and use pullers</th>
<th>Cutting tools:</th>
<th>Identify and use general workshop tools for cleaning, lubrication etc.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Removing and refitting of bearings</td>
<td>Hack saws</td>
<td>Chisels</td>
<td>Shears</td>
<td>Files</td>
<td>Drills</td>
</tr>
<tr>
<td>1.5 Use of workshop tools</td>
<td>3</td>
<td>6</td>
<td>Identify and use the Bench Vise</td>
<td>Drill Machine</td>
<td>Bench Grinder</td>
</tr>
<tr>
<td>1.6 Behave in automotive workshop</td>
<td>2</td>
<td>4</td>
<td>Behave professionally</td>
<td>Display good attitude with colleagues and customers</td>
<td>Display good attitude to the work at hand</td>
</tr>
</tbody>
</table>
### Module 2: Diagnosing and Servicing the Engine

<table>
<thead>
<tr>
<th>Learning Units</th>
<th>Theory hours</th>
<th>Workplace hours</th>
<th>Recommended formative assessment</th>
<th>Recommended Methodology</th>
<th>Scheduled Dates</th>
</tr>
</thead>
</table>
| 2.1 Diagnose and Service the Engine | 40 | 242 | Explain:  
- Engine and its types  
- 4 stroke petrol engine working  
- 2 stroke petrol engine working  
- Working of diesel engine  
- Spark Ignition Engine  
- Describe construction and function of:  
  - Cylinder heads  
  - Valve mechanisms  
  - Cylinder blocks  
  - Piston, piston rings and pins  
  - Connecting rod and big end bearings  
  - Crank shaft and main journal bearings  
  - Fly wheels  
- Remove the engine from the car  
- Dismantle the engine  
- Inspect and check the engine parts  
- Engine timing (valve and ignition)  
- Assemble the engine  
- Adjusting tappet clearance  
- Fit the engine in the car  
- Start the engine  
- Perform Compression test | Questions & Answers | Continues Checking of Job |
| 2.2 Diagnose and Service Fuel Systems | 40 | 243 | - Describe the purpose of a fuel system  
- Describe Air fuel ratios  
- Describe construction, function and operation of fuel systems  
  - Fuel tank  
  - Fuel pumps  
  - Fuel and air filters  
  - Thermostatic air cleaner  
  - Carburetor circuits and attachments  
  - Fuel gauges  
  - Replacing fuel pumps and checking pressure and capacity  
  - Replace air and fuel filters | Questions & Answers  
Written / Oral | Checking the method of |
<table>
<thead>
<tr>
<th>2.3 Diagnose and service the lubricating systems</th>
<th>3</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Explain the purpose, construction and working of an engine lubricating systems</td>
<td></td>
<td>Question and answer</td>
</tr>
<tr>
<td>- Change of oil and filters</td>
<td></td>
<td>Checking the job</td>
</tr>
<tr>
<td>- Service oil pumps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Checking oil pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Diagnose Troubles</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Carburetor service
  - Dismantle, check and assemble the carburetor
  - Setting float level
  - Setting idle speed & mixture
  - Diagnose fuel system troubles
  - Describe E.F.I. systems (T.B.I. & P.F.I.)
- Explain the function of:
  - E.C.M.
  - Sensors (throttle, MAP, Coolant, O₂, Crank position sensor etc.)
  - Actuators
  - Malfunction indicator light
  - Checking E.F.I. Systems
  - Checking and cleaning fuel injectors
  - Relieving fuel line pressure
  - Re-setting inertia switch
  - Testing fuel pressure regulator
  - On board diagnostics
  - Retrieve the trouble codes
  - Using scan tool
  - Checking sensors
  - Diagnosing E.C.M.
- Explain the construction and function of C.N.G. supply systems
- Adjust the mixture
- Explain the construction and function of diesel injection systems components
- List the types of combustion chambers
- Replace the diesel filter
- Bleeding diesel fuel injection system
- Adjust the fuel injector pressure
- Set the injection timing
- Trouble shoot the diesel fuel system
- Explain purpose and working of super, turbo charger and inter cooler

- Questions & Answers
  - Written / Oral
- Questions and answers
- Checking the job
- Question and answers
- Checking the job
- Question and answers
| 2.4 Diagnose and Service of Cooling Systems | 5  | 21 | - Explain the purpose, construction and working of engine cooling systems  
- Describe the function of radiator cap  
- Test the thermostat  
- Adjust the fan belt  
- Replace the water pump  
- Replace the hose pipe  
- Diagnose for problems | Questions and answers  
Checking the job |
| 2.5 Diagnose and Service of Ignition systems | 15 | 60 | - Explain the purpose, construction and operation of ignition systems (battery, ignition switch, blast resistance, ignition coil, distributor and spark plugs)  
- Explain spark plugs types  
- Testing spark  
- Replace C.B. Point  
- Test ignition coil  
- Service of spark plugs  
- Setting of ignition timing  
- Use ignition timing light  
- Use dwell angle tester  
- Diagnose for problems  
- Explain pick up coil ignition, high energy ignition, hall effect switch, optical photodiode distributor, multiple coil distributor less ignition, crank and cam position sensor, direct multiple coil ignition, direct capacitor and discharge ignition.  
- Triggering test  
- Retrieve ignition system troubles  
- Test with a breakout box  
- Check air gap of pick up coil ignition  
- Test pick up coil, hall effect switch  
- Check ignition module | Question and answers  
Checking the job |
| 2.6 Service and diagnose the emission control systems | 5  | 10 | - Explain the purpose of Emission control systems  
- Explain positive crank case ventilation (P.C.V), evaporative control emission, exhaust gas recirculation, and Catalytic converters.  
- Service of P.C.V. systems  
- Service thermostatic air cleaner  
- Explain safety precautions of catalytic converter | Question and answers  
Checking the job |
<p>| 2.7 Service of | 7  | 13 | - Explain the purpose and construction of exhaust systems | Question and Answer |</p>
<table>
<thead>
<tr>
<th>Exhaust system</th>
<th>- Service exhaust systems</th>
</tr>
</thead>
</table>

- Service exhaust systems
### Module 3: Service of Power Train

<table>
<thead>
<tr>
<th>Learning Units</th>
<th>Theory hours</th>
<th>Workplace hours</th>
<th>Recommended formative assessment</th>
<th>Recommended Methodology</th>
<th>Scheduled Dates</th>
</tr>
</thead>
</table>
| 3.1 Diagnose and Service the Clutch Systems | 9            | 50              | - Explain the purpose, construction and operation of a clutch  
- Explain the types of clutch  
- Explain the clutch linkages  
- Remove, check and reinstall the clutch assembly  
- Clutch master cylinder service and bleeding  
- Adjust clutch pedal free play  
- Trouble shooting.                                      | Questions and answers        | Checking the job      |
| 3.2 Diagnose and service of Transmission and transaxle | 13           | 75              | Explain:  
- Define gear ratio  
- Purpose, construction and function of 4 speed synchronomesh gearbox / transaxle  
- Introduction to automatic gears  
- Remove input shaft, output shaft assembly and countershaft  
- Checking and inspection of parts  
- Reassembly  
- Trouble shooting                                      | Questions and answers        | Checking the job      |
| 3.3 Service the drive line              | 5            | 24              | Explain:  
- The purpose of a propeller shaft  
- Construction and function of universal joint and slip joints  
- Remove, check and install a propeller shaft  
- Trouble shooting                                      | Questions and answers        | Checking the job      |
| 3.4 Diagnose & service the differential and axle | 13           | 55              | Describe:  
- The purpose, function and construction of differential and axles (rear and front)  
- Remove, dismantle, check and assemble the               | Questions and answers        | Checking the job      |
<table>
<thead>
<tr>
<th>assembly</th>
<th>differential</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Adjust back lash</td>
<td></td>
</tr>
<tr>
<td>- Remove, check and refit front drive axles,</td>
<td></td>
</tr>
<tr>
<td>- Adjust wheel bearings</td>
<td></td>
</tr>
<tr>
<td>- Trouble shooting</td>
<td></td>
</tr>
</tbody>
</table>

Questions and answers
## Module 4: Servicing Chassis Systems

<table>
<thead>
<tr>
<th>Learning Units</th>
<th>Theory hours</th>
<th>Workplace hours</th>
<th>Recommended formative assessment</th>
<th>Recommended Methodology</th>
<th>Scheduled Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Diagnose and Service the suspension system</td>
<td>9</td>
<td>37</td>
<td>- Explain the purpose of suspension systems&lt;br&gt;- Explain the types of suspension system&lt;br&gt;- Check and replace shock absorbers/refill&lt;br&gt;- Remove and refit leaf springs&lt;br&gt;- Remove and refit of Mc-Pherson struts</td>
<td>Questions and answers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Checking the job</td>
<td></td>
</tr>
<tr>
<td>4.2 Diagnose and Service the steering systems</td>
<td>40</td>
<td>135</td>
<td>- Explain:&lt;br&gt;- The purpose, construction and types of steering systems (Mechanical &amp; Power)&lt;br&gt;- The steering linkages&lt;br&gt;- Explain wheel balance and steering geometry&lt;br&gt;- Service steering gear boxes&lt;br&gt;- Adjust steering wheel free plate&lt;br&gt;- Check and replace the tie rods&lt;br&gt;- Wheel balance&lt;br&gt;- Check Toe in camber, caster, steering axis inclination (S.A.I) toe-in &amp; toe-out on turn&lt;br&gt;- Adjust angles&lt;br&gt;- Trouble shooting</td>
<td>Questions and answers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Checking the job</td>
<td></td>
</tr>
<tr>
<td>4.3 Diagnose and Service the brake system</td>
<td>20</td>
<td>100</td>
<td>- Explain the purpose of brakes&lt;br&gt;- Explain the construction, function &amp; types of brakes&lt;br&gt;- Replace and adjust the brake shoes&lt;br&gt;- Check and replace the disc pads&lt;br&gt;- Check the brake servo unit&lt;br&gt;- Service the master cylinders&lt;br&gt;- Service the wheel cylinder&lt;br&gt;- Bleeding the brakes&lt;br&gt;- Adjust parking brakes&lt;br&gt;- Trouble shooting</td>
<td>Questions and answers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Checking the job</td>
<td></td>
</tr>
</tbody>
</table>
Module 5: Servicing Automotive Electrical

<table>
<thead>
<tr>
<th>Learning Units</th>
<th>Theory hours</th>
<th>Workplace Hours</th>
<th>Recommended formative assessment</th>
<th>Recommended Methodology</th>
<th>Scheduled Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1 Maintenance of the automotive electrical components</td>
<td>20</td>
<td>70</td>
<td>- Explain conductor and insulator&lt;br&gt;- Explain ampere, volt, and resistance&lt;br&gt;- Explain series and parallel circuits&lt;br&gt;- Explain magnet and magnetism&lt;br&gt;- Explain the purpose and function of&lt;br&gt;  • Battery&lt;br&gt;  • Self starter&lt;br&gt;  • Alternator&lt;br&gt;- Connect resistances in series and parallel circuits&lt;br&gt;- Use volt meter and ampere meter&lt;br&gt;- Use of ohm meter&lt;br&gt;- Perform battery maintenance&lt;br&gt;- Cranking motor wiring circuit&lt;br&gt;- Remove and reinstall battery, alternator and self-starter&lt;br&gt;- Replace fuses and bulbs</td>
<td>Questions and answers</td>
<td>Checking the job</td>
</tr>
</tbody>
</table>
# Module 6: Application of Related Studies

<table>
<thead>
<tr>
<th>Learning Units</th>
<th>Theory hours</th>
<th>Workplace hours</th>
<th>Recommended formative assessment</th>
<th>Recommended Methodology</th>
<th>Scheduled Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1 Mathematics</td>
<td>40</td>
<td>-</td>
<td>Calculate</td>
<td>Questions and answers</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Addition</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Subtraction</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Multiplication</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Division</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Fractions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Decimals</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Percentage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.2 Technical drawing</td>
<td>14</td>
<td>60</td>
<td>- Define types of lines, dimensions and lettering</td>
<td>Sketching the drawings</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Define three views</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Define full section and half section</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Complete the sketch/block/circuit diagram of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- 4 stroke engine operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- 2 stroke engine operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Lubrication flow</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Coolant circulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Working of fuel pumps</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Working of carburetors (Idle/High speed circuit)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Battery coil ignition (Circuit diagram)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Electronic ignition (Circuit diagram)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Clutch function (Engage and disengage position)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- 4 speed synchronesh transmission (Power flow in different gears)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Differential function</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Brake Master cylinder working (Tendum, single)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Brake shoe assembly</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Steering linkages (Label the diagram)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Wheel alignment angles (Sketch)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
|   |   | - Series and parallel circuits (complete the circuit)  
|   |   | - Cranking motor circuit (complete the circuit)  
|   |   | - Charging circuit (complete the circuit) |
Supportive notes

Assessment Context

- These learning units may be assessed on the job, off the job or a combination of on and off the job demonstrated by an individual working alone. In some areas continuous assessment may be required to gauge the competency.
- Assessment of the practical skills must take place only after a period of supervised practice and repetitive experience. If work place conditions are not available, assessment is simulated and that the work place conditions are acceptable.
- The prescribed outcome must be achieved without direct supervision.
- Competency should be assessed within the context of the qualification being sought.

Critical Aspects

Assessment must confirm that the candidate is able to:

1: Apply the health and safety legislations while working.
2: Use fire extinguishers.
3: Read measurements with measuring tools.
4: Identify and use the automotive fasteners.
5: Select, handle and use hand tools, workshop tools safely and properly.
6: Check the compression pressure of engine and diagnose the faults.
7: Diagnose problems in different fuel systems and make the necessary adjustment.
8: Set the valve and ignition timing.
9: Diagnose and service the lubricating, cooling, ignition systems.
10: Service the clutch and adjust the free play.
11: Remove, dismantle, check, assemble and refit the transmission.
12: Adjust the back lash of differential.
13: Replace the axle bearing.
14: Accuracy of adjustments.
15: Replace the suspension systems components.
16: Carry out the wheel balancing.
17: Carry out the wheel alignment.
18: Service of various mechanical steering gear boxes.
19: Service of power steering.
20: Adjust the brake system.
21: Bleed the brake system.
22: Connect the battery.
23: Wiring up the cranking motor circuit.
24: Identify and connect the charging system connections.
25: Drive the car amicably in forward and reverse speeds in the ground.
26: Apply the mathematical rules in routine work.
27: Identify and demonstrate the drawings.

Assessment Condition

The candidate will have access to:
- All tools, equipment, materials and documentation required.

The candidates will be permitted to refer the following documents.
- Relevant workplace procedures.
- Relevant product and manufacturing specifications.
- Relevant drawings, manuals, codes, standards and reference material.

The Candidate will be required to:
- Orally or by other methods of communication, answer, questions put forward by the assessor.
- Identify superiors who can be approached for the collection of competency evidence where appropriate.
- Present evidence of credit for any off job training related course.
Special Notes

During assessment the individual will:

- Demonstrate safe working practices all the times.
- Communicate information about processes, events or tasks being under taken to ensure a safe and efficient working environment.
- Take the responsibility for the quality of his/her own work.
- Plan tasks in all situations and review tasks requirements as appropriate.
- Perform all tasks in accordance with standard operating procedures.
- Perform all tasks to specifications.
- Use accepted engineering techniques, practices, processes and work place procedures.
- Items requiring specialize repair will be sent to appropriate specialists.

The tasks involved will be completed within reasonable time frames relating to typical work place activities. The resources required for assessment include tools, equipment and machines listed within these learning units. The completed product should comply with the respective industrial standards.

Resources required

Materials, tools, equipment and machines are listed within the learning units.