

GOVERNMENT OF ESWATINI

MINISTRY OF LABOUR AND SOCIAL SECURITY
DIRECTORATE OF INDUSTRIAL AND VOCATIONAL TRAINING –DIVT
APPRENTICESHIP JOB TRAINING GUIDE
TRADE: MOTOR VEHICLE MECHANIC

FIRST-YEAR

Communicate effectively in an automotive workplace – Unit ID: MVM 201

Element 1: Gather, convey, and receive information

Element 2: Participate in automotive workshop meetings

Element 3: Apply communication skills in a team

Element 4: Use communication specifications

Demonstrate basic knowledge of engineering drawing in different context – Unit ID: MVM 202

Element 1: Demonstrate knowledge of engineering drawing fundamentals.

Element 2: Apply basic drawing techniques.

Element 3: Construct basic free-hand drawings.

Element 4: Construct geometrical drawings.

Element 5: Construct reproduction drawings.

Element 6: Produce basic drawings in first-angle orthographic projection.

Element 7: Produce axonometric drawings.

Element 8: Project prisms and pyramids.

Element 9: Produce basic sectional drawings.

Demonstrate basic knowledge of science in different context – Unit ID: MVM 203

Element 1: Apply knowledge of drawing instruments and SI units.

Element 2: Apply basic knowledge of dynamics in engineering science.

Element 3: Apply knowledge of statics in engineering science.

Element 4: Apply knowledge of energy, work and power.

Element 5: Outline the concept of heat and temperature.

Element 6: Outline the concept of heat capacity and linear expansion.

Element 7: Describe the particle structure of matter.

Element 8: Describe the basic concept of electricity and magnetism.

Element 9: Describe factors influencing electric circuits.

Demonstrate basic knowledge of first aid – Unit ID: MVM 204

Element 1: Sustain a basic level of preparedness for health emergencies in the workplace

Element 2: Perform basic first aid

Element 3: Limit damage to persons or property in the case of an emergency

Element 4: Report accident

Demonstrate basic knowledge of mathematical and engineering science related to automotive mechanics – Unit ID: MVM 205

Element 1: Demonstrate basic knowledge of base and derived units used in the SI system of measurement applicable to automotive mechanics

Element 2: Demonstrate basic knowledge of engineering science terms and calculations associated with automotive mechanics

Demonstrate basic knowledge of workplace health and safety – Unit ID: MVM 206

Element 1: Demonstrate knowledge of hazard and risk control

Element 2: Demonstrate knowledge of workshop signs and floor markings

Element 3: Demonstrate knowledge of workplace fire safety

Element 4: Interpret an emergency evacuation plan

Element 5: Apply knowledge to conduct an emergency response

Element 6: Read material safety data sheet

Element 7: Proper waste disposal

Demonstrate knowledge and understanding of electrical fundamentals – Unit ID: MVM 207

Element 1: Identify and measure electrical and electronic components

Element 2: Demonstrate knowledge of inductance for automotive applications

Element 3: Demonstrate knowledge of resistors used in automotive electronic applications

Element 4: Create series, parallel and series-parallel circuits using resistors, and calculate

Element 5: Calculate values of power, given any two variables: voltage, current, or resistance.

Demonstrate knowledge of fuel, lubricants, and materials derived from oil – Unit ID: MVM 208

Element 1: Describe different types of fuels obtained from crude oil.

Element 2: Describe the basic oil refinery process

Element 3: Describe applications of crude oil bi-products

Element 4: Describe different types of lubricants

Element 5: Describe different types of materials derived from oil used in vehicles

Element 6: Describe natural gas and liquefied petroleum gas

Element 7: Describe biofuels

Demonstrate knowledge of motor vehicle care – Unit ID: MVM 209

Element 1: Describe general motor vehicle inspection and checks

Element 2: Describe external vehicle body care

Element 3: Describe internal vehicle care

Element 4: Describe motor vehicle body cleaning detergents

Demonstrate knowledge of motor vehicle fundamentals – Unit ID: MVM 210

Element 1: Describe motor vehicle components and their operation

Element 2: Describe vehicle body parts

Element 3: Describe motor vehicle systems

Element 4: Describe how motor vehicles are classified

Element 5: Describe motor vehicle safety systems

Remove and replace wheels and tyres - Unit ID: MVM 212

Element 1: Undertake routine checks of wheel assembly and associated components

Element 2: Remove wheel from motor vehicle

Element 3: Remove and refit the tyre to the wheel

Element 4: Complete the work process and inspect refitted wheel

Use and maintain measuring equipment and hand tools in an automotive workplace – Unit ID: MVM 214

Element 1: Use and care for basic hand tools

Element 2: Use and care for electrical driven hand tools

Element 3: Use and care for air tools

Element 4: Use and care for special service tools

Element 5: Use lifting equipment

Element 6: Apply workshop information system

Element 7: Prepare to undertake measurements

Element 8: Conduct measurements and analyze results

Element 9: Maintain measuring tools and equipment

SECOND - YEAR

Remove, prepare and install bearings, seals, gaskets, sealants, adhesives and locking devices – Unit ID: MVM 211

Element 1: Identify different types of bearings and seals

Element 2: Select and use bearings, seals, gaskets, sealants, adhesives and locking methods

Element 3: Remove and install bearings and seals

Element 4: Prepare to install bearings, seals and gaskets

Element 5: Carry out installation of bearings, seals and gaskets

Element 6: Completion of work

Remove and replace electrical and electronic units – Unit ID: MVM 213

Element 1: Plan and prepare for work

Element 2: Remove and restore electrical and electronic units

Element 3: Replace electrical and electronic units

Element 4: Complete work and clean up

Apply basic entrepreneurship skills – Unit ID: MVM 215

Element 1: Demonstrate basic knowledge of characteristics of an entrepreneur

Element 2: Apply basic skills to generate a business idea

Element 3: Apply basic market research skills

Element 4: Determine costs and prices in a manufacturing business

Element 5: Apply creativity to develop a business identity

Apply fundamental knowledge of engineering drawing in different contexts – Unit ID: MVM 301

Element 1: Apply knowledge of engineering drawing fundamentals.

Element 2: Produce drawings of fastening devices, welding joints and screw threads.

Element 3: Apply knowledge of machining and surface texture symbols.

Element 4: Produce advanced drawings in first angle orthographic projection.

Element 5: Produce isometric drawings.

Element 4: Produce advanced drawings in first angle orthographic projection.

Element 5: Produce isometric drawings.

Element 6: Produce drawings in third-angle orthographic projection.

Element 7: Use curves of interpenetrations in drawings.

Apply knowledge of basic mathematics in different contexts – Unit ID: MVM 302

Element 1: Apply laws of exponents and logarithms to solve exponential equations and logarithmic expressions.

Element 2: Carry out factorization.

Element 3: Solve and manipulate equations, word problems, and technical formulae.

Element 4: Solve linear and quadratic graph

Element 5: Apply knowledge of goniometry, angular and peripheral velocity and sectors of circles.

Element 6: Apply knowledge of circles.

Element 7: Apply intermediate knowledge of trigonometry.

Element 8: Carry out mensuration on various objects.

Apply knowledge of fundamental engineering science in different contexts – Unit ID: MVM 303

Element 1: Apply fundamental knowledge of dynamics in engineering science.

Element 2: Apply fundamental knowledge of statics in engineering science.

Element 3: Apply knowledge of energy and momentum.

Element 4: Perform calculations related to work, power and efficiency.

Element 5: Apply knowledge related to mechanical drives and lifting machines.

Element 6: Apply knowledge of friction.

Element 7: Apply fundamental knowledge of heat and linear expansion of material.

Element 8: Demonstrate fundamental knowledge of particle structure of matter and principles of electricity.

Element 9: Demonstrate basic knowledge of hydraulics.

Carry out motor vehicle major service – Unit ID: MVM 304

Element 1: Describe motor vehicle service schedules

Element 2: Describe job card completion and calculation of labour hours

Element 3: Conduct vehicle inspection

Element 4: Change engine oil

Element 5: Replace filters

Element 6: Check and change fluids

Element 7: Change spark plugs

Element 8: Lubricate moving parts

Element 9: Change fan belt

Element 10: Replace brake pads and brake shoes

Demonstrate knowledge of basic electrical and electronic circuits and components – Unit ID: MVM 305

Element 1: Describe different electrical and electronic terms

Element 2: Describe basic electrical fundamentals

Element 3: Describe basic semiconductor fundamentals

Element 4: Read and interpret circuit diagrams and symbols

Element 5: Build basic electrical and electronic circuits

Element 6: Describe Alternating Current and Direct Current systems

Maintain batteries and lighting system- Unit ID: MVM 306

Element 1: Describe the operation of a basic motor vehicle battery

Element 2: Describe battery maintenance

Element 3: Bench charging batteries

Element 4: Storage and disposal of batteries

Element 5: Describe lighting system

Element 6: Repair lighting system

Element 7: Describe intelligent and adaptive headlights

Element 8: Adjust headlights

Maintain suspension system – Unit ID: MVM 308

Element 1: Describe different types of suspension systems

Element 2: Inspect suspension system

Element 4: Replace shock absorbers and dampers

Element 5: Service electronically controlled suspension

Element 6: Service McPherson Strut suspensions

Element 7: Service air suspension system

Element 8: Service maintain independent front and rear suspensions

Maintain engine cooling systems – Unit ID: MVM 309

Element 1: Describe principles of heat transfer

Element 2: Describe different types of cooling systems

Element 3: Replace cooling systems components

Element 4: Test cooling systems

Repair vehicle oil lubrication system – Unit ID: MVM 311

Element 1: Describe engine lubrication system layout

Element 2: Describe the lubricating oils and applications

Element 3: Describe different types of oil pumps

Element 4: Replace oil pump

Element 5: Replace oil filters

Element 6: Repair lubrication circuits

THIRD-YEAR

Maintain motor vehicle emission control – Unit ID: MVM 307

Element 1: Describe the purpose of emission control

Element 2: Use diagnostic scan tools operation

Element 3: Service engine emission control systems

Element 4: Service air intake systems

Element 5: Service crankcase emission control

Element 6: Service exhaust gas recirculation system

Element 7: Service evaporative emission control

Repair steering systems and wheels – Unit ID: MVM 310

Element 1: Describe basic principles of steering systems

Element 2: Describe steering system components

Element 3: Describe power assisted steering systems

Element 4: Describe four wheel steering systems

Element 5: Maintain steering systems

Element 6: Replace steering system components

Element 7: Describe wheel and tyre construction and applications

Element 8: Conduct wheel balancing

Service hydraulic and electronically controlled motor vehicle braking systems – Unit ID: MVM 312

Element 1: Describe function and operation of a braking system

Element 2: Maintain hydraulic brake system

Element 3: Maintain emergency/parking brake systems

Element 4: Demonstrate understanding of electronically controlled hydraulic brake system

Element 5: Maintain traction control system

Element 6: Maintain active and emergency brake systems

Element 7: Maintain anti-lock brake system

Element 8: Hill start, hold and downhill descent control system

Element 9: Electronic stability program control system

Use and maintain diagnostic testing tools and equipment – Unit ID: MVM 313

Element 1: Describe diagnostic tools and equipment

Element 2: Use different diagnostic tools and equipment

Element 3: Maintain different diagnostic tools and equipment

Demonstrate an understanding of professional values and ethics – Unit ID: MVM 402

Element 1: Human values are adhered to

Element 2: Describe and reflect on what professional values are and where they stem from.

Element 3: Describe professional accountability.

Element 4: Position professional values within an organisational context.

Determine causes of engine failure – Unit ID: MVM 403

Element 1: Demonstrate knowledge of principles of engine diagnostics and procedures.

Element 2: Diagnose engine failures.

Element 3: Determine causes of component failure

Element 4: Conduct post-operation functions.

Diagnose and repair cooling and lubrication systems – Unit ID: MVM 405

Element 1: Describe the operation of a cooling and lubrication systems

Element 2: Read and interpret the job instructions.

Element 3: Prepare and position the vehicle for inspection

Element 4: Connect the test equipment and diagnose faults.

Element 5: Repair and test the system.

Diagnose and repair faults in a carburetted fuel system – Unit ID: MVM 406

Element 1: Read and interpret the job instructions.

Element 2: The differences in the design of carburettor systems are explained in terms of their functions and limitations.

Element 3: Repair carburettor and fuel system faults and test the operation.

Element 4: Restore work area, complete and process documentation.

Diagnose and repair hydraulic and electronic brake systems – Unit ID: MVM 408

Element 1: Read and interpret the job instructions.

Element 2: Prepare and position the vehicle

Element 3: Diagnose and repair faults on hydraulic and electronic braking systems

Element 4: Confirm functionality of the brake system after repairs.

Element 5: Restore the work area and complete and process documentation

Repair suspension system – Unit ID: MVM 413

Element 1: Read and interpret the job instructions

Element 2: Prepare the vehicle and inspect the suspension for faulty parts

Element 3: Repair the suspension system

Element 4: Perform quality checks on the repaired suspension system

Element 5: Restore the work area and complete and process documentation

Write a technical report – Unit ID: MVM 417

Element 1: Collect information for writing the report.

Element 2: Plan the writing of the report.

Element 3: Write the report

Element 4: Revise the report.

FORTH-YEAR

Diagnose and rectify engine malfunction – Unit ID: MVM 404

Element 1: Demonstrate knowledge of engine malfunctions

Element 2: Diagnose engine malfunctions.

Element 3: Rectify engine malfunctions

Element 4: Conduct post-operation functions performance criteria

Diagnose and repair faults on advanced auto electrical systems – Unit ID: MVM 407

Element 1: Describe the operation of the different advanced electrical systems

Element 2: Read and interpret automotive electric circuit diagrams and symbols

Element 3: Select and use test equipment to locate faults on auto electric circuits

Element 4: Replace faulty components

Diagnose and repair steering system components – Unit ID: MVM 409

Element 1: Read and interpret the job instructions.

Element 2: Explain the function and operation of a steering system.

Element 3: Inspect and determine the condition of the steering system, system faults and causes.

Element 4: Diagnose and repair steering system components and test the operation.

Foster and maintain customer relations – Unit ID: MVM 410

Element 1: Describe organisational structures and products/services for specific contexts

Element 2: Operate within a specific customer service system according to context requirements

Element 3: Identify customer needs and expectations within specific contexts

Element 4: Deal with customer complaints according to specified procedures

Element 5: Choose interpersonal behaviours appropriate for occupational situations

Remove, disassemble, assemble a cylinder head, and fit to engine – Unit ID: MVM 411

Element 1: Prepare to remove the cylinder head

Element 2: Assemble the cylinder head

Element 3: Top overhaul is carried out

Element 4: Assemble cylinder head

Element 5: Fit the cylinder head to an engine.

Element 6: Conduct post-operation functions.

Maintain manual transmission – Unit ID: MVM 412

Element 1: Read and interpret the job instructions.

Element 2: Remove the transmission for maintenance

Element 3: Assess the condition of the parts.

Element 4: Assemble the transmission.

Element 5: Check the operational condition after assembly

Element 6: Restore the work area, and complete and process documentation.

FIFTH-YEAR

Assemble an engine sub assembly – Unit ID: MVM 401

Element 1: Prepare to assemble sub-assembly

Element 2: Assemble sub assembly

Element 3: Test sub-assembly for functionality

Element 4: Conduct post operation functions.

Service and repair advanced electronic automobile ignition systems – Unit ID: MVM 414

Element 1: Read, discuss and interpret automobile advanced electronic ignition system circuit diagrams and symbols

Element 2: Maintain and test advanced electronic ignition system and components

Element 3: Select, explain and discuss the various components used in automobile advance electronic ignition systems

Element 4: Diagnose advance electronic ignition system faults

Element 5: Complete fault-finding reports and requisition forms

Supervise workers at level 2 and 3 in MVM environment – Unit ID: MVM 415

Element 1: Plan the work methods and organize resources with individuals and teams.

Element 2: Update and achieve work objectives, delegate, control and organise individuals and teams.

Element 3: Supervise and manage production, work and services of individuals and teams.

Element 4: Evaluate the performance of individuals and teams.

Test automatic transmission – Unit ID: MVM 416

Element 1: Read and interpret the job instructions.

Element 2: Select and connect the required test equipment.

Element 3: Test and adjust automatic transmissions

Element 4: Check the operational condition after adjustment.

Diagnose and repair faults in an electronic fuel injection system – Unit ID MVM 418

Element 1: Read and interpret the job instructions.

Element 2: The differences in the design of electronic fuel injection systems are explained in terms of their functions and limitations.

Element 3: Repair electronic fuel injection system faults and test the operation.

Element 4: Restore work area, complete and process documentation.