Republic of Rwanda
Ministry of Education

RTB | RWANDA TVET BOARD

VEHICLE CONTROL SYSTEMS MAINTENANCE

AUTCM401

Competence: Maintain Vehicle Control Systems

RQF Level: 4

Learning Hours: 120

Credits: 12

Sector: **Transport and logistics**

Trade: **Automobile technology**

Module Type: **Specific**

Curriculum: **TRLAUT 4001- TVET Level IV in automobile technology**

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<table>
<tr><td>Purpose statement</td><td colspan="5">This module describes the knowledge, skills and attitude required to repair vehicle control systems. It is intended to be pursued by learners at TVET certificate level IV in automobile technology. At the end of this module the trainees will be able to maintain brake, steering and suspension systems with minimum supervision.</td></tr>
<tr><td>Leaning assumed to be in place</td><td colspan="5">Implement SHE policies and procedures, Overhaul diesel engine, Repair diesel engine systems, Maintain manual transmission system.</td></tr>
<tr><td rowspan="6">Delivery modality</td><td colspan="2">Training delivery</td><td>100%</td><td colspan="2">Assessment</td><td>Total 100%</td></tr>
<tr><td colspan="2">Theoretical content</td><td>30%</td><td rowspan="4">Formative assessment</td><td>30%</td><td rowspan="4">50%</td></tr>
<tr><td colspan="2">Practical work:</td><td rowspan="3">70%</td><td rowspan="3">70%</td></tr>
<tr><td>• Group project and presentation</td><td>20%</td></tr>
<tr><td>• Individual project /Work</td><td>50%</td></tr>
<tr><td colspan="2"></td><td colspan="2">Summative Assessment</td><td>50%</td></tr>
</table>

Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1. **Maintain brake system.**	1.1. The brake system is appropriately identified according to their types
	1.2. Brake system components are appropriately identified according to their types
	1.3. Brake system components is appropriately described according to their types
	1.4. Tools, materials, and equipment are properly selected according to the work to be done
	1.5. The brake system is properly inspected according to the manufacturer's instructions
	1.6. The brake system components are appropriately dismounted according to the repair procedures
	1.7. The brake system components are appropriately disassembled according to the repair manual
	1.8. The brake system is properly cleaned/inspected according to the manufacturer's

	instructions
	1.9. The brake system damaged components are properly replaced/adjusted/rectified according to damaged parts
	1.10. The brake system components are properly reassembled according to the manufacturer instructions
	1.11. The brake system components are properly remounted according to the repair manual
	1.12. Brake system is properly bled and refilled according to the manufacturer instructions
	1.13. The brake system is correctly tested according to the repair manual
2. **Maintain steering system**	2.1. The steering system is appropriately identified according to their control type
	2.2. The steering system components are appropriately identified according to their types
	2.3. Type steering system components are appropriately described according to their types
	2.4. Tools, materials, and equipment are properly selected according to the work to be done.
	2.5. Steering system is properly inspected according to the manufacturer's instruction
	2.6. The steering system components are appropriately dismantled according to the repair procedures
	2.7. The steering system components are appropriately disassembled according to the repair procedures
	2.8. The steering system components are correctly cleaned and inspected according to the manufacturer instructions
	2.9. The steering system damaged components are replaced/adjusted according to the damaged parts
	2.10. The steering system components are appropriately reassembled according to the manufacturer instructions

	2.11. The steering system components are appropriately remounted according to the manufacturer instructions
	2.12. The steering system is correctly tested based on the functionality
3. **Maintain suspension system**	3.1 The suspension system is appropriately identified according to their types
	3.2 The suspension system components are appropriately identified according to their types
	3.3 Type suspension system components are appropriately described according to their types
	3.4 Tools, materials, and equipment are properly selected according to the type of manufacturer instructions
	3.5 The suspension system components are appropriately inspected according to the repair manuals
	3.6 The suspension system components are adequately dismounted according to the repair manuals
	3.7 The suspension system components are appropriately disassembled according to the manufacturer instructions
	3.8 The suspension system components are correctly cleaned according to the manufacturer instructions
	3.9 The suspension system damaged components are replaced /adjusted according to damaged parts
	3.10 The suspension system components are appropriately reassembled according to the manufacturer instructions
	3.11 The suspension system components are appropriately remounted according to the manufacturer instructions.
	3.12 The suspension system is correctly tested based on the functionality

Intended Knowledge, Skills, and Attitude

Knowledge	Skills	Attitude
✓ Types of tools, materials, and equipment ✓ Basic mechanical principles ✓ Mechanical attitude ✓ Applied mathematics ✓ Applied physics ✓ Applied chemistry ✓ Safety rules, precautions and security ✓ Fluids principles ✓ Use of Personal Protective equipment ✓ Technical drawing ✓ Interpretation of specifications	✓ Computer skills ✓ Communication skills ✓ Troubleshooting skills ✓ Report elaboration skills ✓ Good service delivering skills ✓ Interpersonal skills ✓ Analytical skills ✓ Problem-solving skills ✓ Task management skills ✓ Parts replacement skills ✓ Diagnostic skills ✓ Proper use of measurement instruments.	✓ Honest ✓ Accountability ✓ Self-motivated ✓ Gender sensitive ✓ Customer care oriented ✓ Decisive ✓ Time management ✓ Humble ✓ Creative ✓ Patient ✓ Responsible ✓ Innovative ✓ Flexible ✓ Integrity ✓ Goal oriented ✓ Self-confident

Course content

Learning outcomes	At the end of this module the learner will be able to: 1. Maintain Brake System. 2. Maintain Steering System **3.** Maintain Suspension System
Learning outcome 1: Maintain brake System	**Learning hours: 40**
	Indicative content
• **Identification of brake system.** ✓ Disc brake system ✓ Drum brake system • **Identification and description of brake system components.** ✓ Disc, ✓ Brake pads	

- ✓ Brake callipers
- ✓ Master cylinder
- ✓ Brake pedal
- ✓ Brake shoes
- ✓ Brake drum
- ✓ Brake booster
- ✓ Brake horses
- ✓ Wheel cylinders and seals.

- **Selection of Tools, materials, and equipment.**
  - ✓ Hand tools
  - ✓ Power tools
  - ✓ Measuring tools
  - ✓ Materials
  - ✓ Equipment
- **Inspection of brake system.**
  - ✓ Brake system leakage
  - ✓ Brake system looseness
  - ✓ Brake system wear
- **Dismounting of brake system components.**
  - ✓ Disc,
  - ✓ Brake pads
  - ✓ Brake callipers
  - ✓ Master cylinder
  - ✓ Brake pedal
  - ✓ Brake booster
  - ✓ Brake shoes
  - ✓ Brake drum
  - ✓ Brake horses
  - ✓ Wheel cylinders and seals.
- **Disassembling of brake system components**

- ✓ Brake callipers
- ✓ Master cylinder
- ✓ Brake pedal
- ✓ Brake booster
- ✓ Wheel cylinders and seals.

- **Inspection/ cleaning of brake system**
  - ✓ Inspection of brake system condition
  - ✓ Cleaning of brake system components:
    - Disc,
    - Brake callipers
    - Master cylinder
    - Brake pedal
    - Brake booster
    - Brake drum
    - Brake horses
    - Wheel cylinders

- **Replacement/adjustment/rectification of brake system damaged components**
  - ✓ Replacement of brake system components:
    - Disc,
    - Brake pads
    - Brake callipers
    - Master cylinder
    - Brake pedal
    - Brake booster
    - Brake shoes
    - Brake drum
    - Brake horses
    - Wheel cylinders and seals
  - ✓ Adjustment of brake system components:

- Brake pedal
- Brake shoes
- Parking brake level

✓ Rectification of brake system components:

- Brake disc
- Brake drum

- **Reassembling of brake system components**
  - ✓ Brake callipers
  - ✓ Master cylinder
  - ✓ Brake pedal
  - ✓ Brake booster
  - ✓ Wheel cylinders
- **Remounting of brake system components**
  - ✓ Disc,
  - ✓ Brake pads
  - ✓ Brake callipers
  - ✓ Master cylinder
  - ✓ Brake pedal
  - ✓ Brake booster
  - ✓ Brake shoes
  - ✓ Brake drum
  - ✓ Brake horses
  - ✓ Wheel cylinders
- **Bleeding and refilling of brake system.**
  - ✓ Flashing process
  - ✓ Bleeding process
- **Testing of brake system.**
  - ✓ Function test

Resources required for the learning outcome

• Equipment	• Cutting equipment, Hydraulic press, Air compressor, Car lifter, Bench vice, Dust bin, Repair bench, Hydraulic jack, jack stand, PPE, Multimeter, Drain pan, Hoists, brake tester, brake lather machine
• Materials	• Water, Solvents, Sandpapers, Silicon, Rags, brake shoes, brake pads, brake drum, brake fluid, antirust (WD40).
• Tools	• Complete toolbox, Screwdrivers, Hammer, Pliers, Files, Cutters, Punches and chisels, Bolts extractors, Threads restore kit or taper, Air impact spanners, Vernier calliper, Dial gauge, 4WD wheel bearing lock nut wrench, Bearing Race & Seal Driver Tools, Axle Nut Deep Impact Sockets, Clutch alignment tool, Front wheel drive bearing adapter kit, Axle poppet kit, Gear wrench universal ball joint separator, Scan tool.
• Facilitation techniques	• Demonstration • simulation • Group discussion • Practical exercises
• Formative assessment methods	• Written assessment. • Performance assessment • product based assessment

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Learning outcome 2: Maintain Steering system	**Learning hours: 40**
Indicative content	

- **Identification of steering system.**
  - ✓ Mechanical steering linkage type
  - ✓ Hydraulic power assisted steering.
  - ✓ Electro-hydraulic power assisted steering.
  - ✓ Electric power assisted steering.
- **Identification and description of steering system components**
  - ✓ Mechanical steering linkage type components.
    - Steering wheel
    - Steering column
    - Steering gearbox
    - Steering linkages
  - ✓ Hydraulic power assisted steering components.
    - Hydraulic reservoir
    - Hydraulic pump

- Power steering cooler
- Pressure relief valve
- Hydraulic hoses
- Power steering belt
- Hydraulic rotary control valve
- Steering gearbox
- Steering linkages

✓ Electro-hydraulic power assisted steering components.

- Electric motor
- Hydraulic pump
- Fluid reservoir
- Reservoir cap
- Fluid level sensor
- Electronic controller
- Electrical connectors
- Steering shaft torque sensor
- Steering wheel position sensor

✓ Electric power assisted steering components.

- Torque sensor
- Electric motor
- Rotational angle sensor
- Controller
- Vehicle speed sensor
- Coupling between motor and steering mechanism

- **Selection of tools, materials, and equipment**
  - ✓ Hand tools
  - ✓ Power tools
  - ✓ Measuring tools
  - ✓ Materials
  - ✓ Equipment

- **Inspection of steering system.**
  - ✓ Mechanical steering linkage type
    - For Looseness
    - For Bending
  - ✓ Hydraulic power assisted steering.
    - Leakage
    - Power steering belt
  - ✓ Electro-hydraulic power assisted steering.
    - Leakage
    - Electrical connection
  - ✓ Electric power assisted steering.
    - Electrical connection
- **Dismounting of steering system components.**
  - ✓ Mechanical steering linkage type components.
    - Steering wheel
    - Steering column
    - Steering gearbox
    - Steering linkages
  - ✓ Hydraulic power assisted steering components.
    - Hydraulic reservoir
    - Hydraulic pump
    - Power steering cooler
    - Hydraulic horses
    - Power steering belt
    - Hydraulic rotary control valve
  - ✓ Electro-hydraulic power assisted steering components.
    - Electric motor
    - Hydraulic pump
    - Electronic controller
    - Electrical connectors

- Steering shaft torque sensor
- Steering wheel position sensor

✓ Electric power assisted steering components.

- Torque sensor
- Electric motor
- Rotational angle sensor
- Controller
- Vehicle speed sensor
- Coupling between motor and steering mechanism

- **Disassembling of steering system components.**

✓ Mechanical steering linkage type components.

- Steering wheel
- Steering column
- Steering gearbox
- Steering linkages

✓ Hydraulic power assisted steering components.

- Hydraulic pump
- Hydraulic rotary control valve
- Steering gearbox
- Steering linkages

✓ Electro-hydraulic power assisted steering components.

- Electric motor
- Hydraulic pump

✓ Electric power assisted steering components.

- Electric motor
- Coupling between motor and steering mechanism

- **Cleaning and inspection of steering system components.**

✓ Mechanical steering linkage type components.

- Steering wheel
- Steering column

- Steering gearbox
- Steering linkages

✓ Hydraulic power assisted steering components.

- Hydraulic reservoir
- Hydraulic pump
- Power steering cooler
- Pressure relief valve
- Hydraulic horses
- Power steering belt
- Hydraulic rotary control valve
- Steering gearbox
- Steering linkages

✓ Electro-hydraulic power assisted steering components.

- Electric motor
- Hydraulic pump
- Fluid reservoir
- Reservoir cap
- Fluid level sensor
- Electronic controller
- Electrical connectors
- Steering shaft torque sensor
- Steering wheel position sensor

✓ Electric power assisted steering components.

- Torque sensor
- Electric motor
- Rotational angle sensor
- Controller
- Vehicle speed sensor
- Coupling between motor and steering mechanism

✓ Inspection of steering system components conditions

- **Replacement/Adjustment of steering system damaged components**
  - ✓ Mechanical steering linkage type components.
    - Steering wheel
    - Steering column
    - Steering gearbox
    - Steering linkages
  - ✓ Hydraulic power assisted steering components.
    - Hydraulic reservoir
    - Hydraulic pump
    - Power steering cooler
    - Pressure relief valve
    - Hydraulic horses
    - Power steering belt
    - Hydraulic rotary control valve
    - Steering gearbox
    - Steering linkages
  - ✓ Electro-hydraulic power assisted steering components.
    - Electric motor
    - Hydraulic pump
    - Fluid reservoir
    - Reservoir cap
    - Fluid level sensor
    - Electronic controller
    - Electrical connectors
    - Steering shaft torque sensor
    - Steering wheel position sensor
  - ✓ Electric power assisted steering components.
    - Torque sensor
    - Electric motor
    - Rotational angle sensor

- Controller
- Vehicle speed sensor
- Coupling between motor and steering mechanism

✓ Adjustment of steering system damaged components

- Steering gearbox backlash
- Steering wheel alignment

- **Reassembling of steering system components.**

✓ Mechanical steering linkage type components.

- Steering wheel
- Steering column
- Steering gearbox
- Steering linkages

✓ Hydraulic power assisted steering components.

- Hydraulic pump
- Hydraulic rotary control valve
- Steering gearbox
- Steering linkages

✓ Electro-hydraulic power assisted steering components.

- Electric motor
- Hydraulic pump

✓ Electric power assisted steering components.

- Electric motor
- Coupling between motor and steering mechanism

- **Remounting of steering system components.**

✓ Mechanical steering linkage type components.

- Steering wheel
- Steering column
- Steering gearbox
- Steering linkages

✓ Hydraulic power assisted steering components.

- Hydraulic reservoir
- Hydraulic pump
- Power steering cooler
- Hydraulic horses
- Power steering belt
- Hydraulic rotary control valve

✓ Electro-hydraulic power assisted steering components.

- Electric motor
- Hydraulic pump
- Electronic controller
- Electrical connectors
- Steering shaft torque sensor
- Steering wheel position sensor

✓ Electric power assisted steering components.

- Torque sensor
- Electric motor
- Rotational angle sensor
- Controller
- Vehicle speed sensor
- Coupling between motor and steering mechanism

- **Testing of steering system functionality.**

Resources required for the indicative content	
Equipment	Computer Four Wheel Aligner, air compressor, Bench Grinder, Hydraulic Press, Vehicle Lift (Hoist), Safety Stands, Magnetic wheel alignment gauge, Vacuum hand pump, PPE.
Materials	Grease, Steering fluid, shop rags, Water, Solvents, Sandpapers, Silicon, steering spare parts.
Tools	Complete toolbox, Tie rod sleeve adjusting tool, Steering wheel locking tool, Toe Gauge, Track Gauge, Scan Tool, Floor Jack, Magnetic wheel alignment gauge, Rim clamps, Plumb bob, Tram gauge, Turing radius gauge, Torque stick, Various types of torque wrenches, Pitman Arm Puller, Power steering pressure gauge, Ball joint removal and installation tool, Tie rod end and ball joint puller, Air Chisel or

	Hammer, Machinist's Rule.
Facilitation techniques	• Group discussion • Practical exercises • Demonstration • simulation
Formative assessment methods	• Written assessment. • Performance assessment • Product based assessment

Learning outcome 3: Maintain Suspension System	**Learning hours: 40**
Indicative content	

- **Identification of suspension system**
  - ✓ Dependent suspension
  - ✓ Semi rigid axle suspension
  - ✓ Independent suspension
- **Identification and description of suspension system components**
  - ✓ Dependent suspension system components
    - spring bracket
    - leaf spring
    - spring buckle
    - beam of the front bridge
    - spring shackle
    - U-bolt
  - ✓ Semi rigid axle suspension system components
    - Panhard rod
    - spring and shock absorber
    - twist beam axle assembly
    - trailing arms
    - crossbeam
  - ✓ Independent suspension system components

- Macpherson Strut
- Knuckle or Upright
- Linkages
- Wheels/tyres
- Dampers/Shock Absorbers
- Springs
- Control arms
- Modified Struts
- Anti Sway Bars
- Torsion bar
- Ball Joints
- Spindle

- **Selection of tools, materials, and equipment.**
  - ✓ Hand Tools
  - ✓ Power tools
  - ✓ Measuring tools
  - ✓ Materials
  - ✓ Equipment
- **Inspection of suspension system components.**
  - ✓ Ride height
  - ✓ Suspension linkage bending
  - ✓ Leakage of Shock Absorbers
  - ✓ Wear of Shock Absorbers
  - ✓ Wear of suspension bushings
- **Dismounting of suspension system components**
  - ✓ Dismounting procedures
- **Disassembling of suspension system components.**
  - ✓ Dependent suspension system components
    - leaf spring
  - ✓ Semi rigid axle suspension system components

- spring and shock absorber

✓ Independent suspension system components

- Macpherson Strut
- Dampers/Shock Absorbers

- **Cleaning of suspension system components.**

✓ Dependent suspension system components

- spring bracket
- leaf spring
- spring buckle
- beam of the front bridge
- spring shackle
- U-bolt

✓ Semi rigid axle suspension system components

- Panhard rod
- spring and shock absorber
- twist beam axle assembly
- trailing arms
- crossbeam

✓ Independent suspension system components

- Macpherson Strut
- Knuckle or Upright
- Linkages
- Wheels/tyres
- Dampers/Shock Absorbers
- Springs
- Control arms
- Modified Struts
- Anti-sway Bars
- Ball Joints
- Torsion bar

- Spindle

- **Replacement /adjustment of suspension system damaged components.**
  - ✓ Replacement of dependent suspension system components
    - spring bracket
    - leaf spring
    - spring buckle
    - beam of the front bridge
    - spring shackle
    - U-bolt
  - ✓ Replacement of semi rigid axle suspension system components
    - Panhard rod
    - spring and shock absorber
    - twist beam axle assembly
    - trailing arms
    - crossbeam
  - ✓ Replacement of independent suspension system components
    - Macpherson Strut
    - Knuckle or Upright
    - Linkages
    - Wheels/tyres
    - Dampers/Shock Absorbers
    - Springs
    - Control arms
    - Modified Struts
    - Anti-sway Bars
    - Ball Joints
    - Torsion bar
    - Spindle
  - ✓ Adjustment independent suspension system components
    - Ride height

- **Reassembling of suspension system components**
  - ✓ Dependent suspension system components
    - leaf spring
  - ✓ Semi rigid axle suspension system components
    - spring and shock absorber
  - ✓ Independent suspension system components
    - Macpherson Strut
    - Dampers/Shock Absorbers
- **Remounting of suspension system components**
  - ✓ Remounting procedures
- **Testing suspension system**
  - ✓ Function test

Resources required for the indicative content	
Equipment	Cutting equipment, Hydraulic press, Air compressor, Car lifter, Bench vice, Dust bin, Repair bench, Hydraulic jack, jack stand, PPE, Hoists, Grease gun, coil spring compressor, suspension tester machine, axle play detector.
Materials	Water, Solvents, Sandpapers, Silicon, Rags, Grease, suspension spare parts.
Tools	Complete toolbox, Screwdrivers, Hammer, Pliers, Files, Cutters, Punches and chisels, Bolts extractors, Threads restore kit or taper, Air impact spanners, Vernier caliper, Dial gauge, 4WD wheel bearing lock nut wrench, Bearing Race & Seal Driver Tools, Axle Nut Deep Impact Sockets, Front wheel drive bearing adapter kit, Axle poppet kit, Gear wrench universal ball joint separator, Scan tool.
Facilitation techniques	• Demonstration • simulation • Group discussion • Practical exercises
Formative assessment methods	• Written assessment. • Performance assessment • product based assessment

Integrated/Summative assessment (For specific module)

Integrated situation

Mrs. KAMALI has been driving TOYOTA Landcruiser from Kigali to Musanze. During his travel, he made an accident with another vehicle on the front right side. He took his vehicle to MUHABURA garage located in MUSANZE district for repair. His vehicle was damaged on the lower control arm, tie rod, center link, and MacPherson strut of right side and, also brake caliper and brake disk was cracked, now garage foreman assign you as vehicle suspension mechanic to repair the stated above components within 6 hours.

Resources

Tools	Complete toolbox, Screwdrivers, Hammer, Pliers, Files, Cutters, Punches and chisels, Bolts extractors, Threads restore kit or taper, Air impact spanners, Vernier caliper, Dial gauge, 4WD wheel bearing lock nut wrench, Bearing Race & Seal Driver Tools, Axle Nut Deep Impact Sockets, Front wheel drive bearing adapter kit, Axle poppet kit, Gear wrench universal ball joint separator, Scan tool.
Equipment	Cutting equipment, Hydraulic press, Air compressor, Car lifter, Bench vice, Dust bin, Repair bench, Hydraulic jack, jack stand, PPE, Hoists, Grease gun, coil spring compressor, suspension tester machine, axle play detector.
Materials/ Consumables	Water, Solvents, Sandpapers, Silicon, Rags, Grease, lower control arm, tie rod, center link, MacPherson strut, brake caliper, brake disk

Assessable outcomes	Assessment criteria (Based on performance criteria)	Indicator	Observation		Marks allocation
			Yes	No	
1. Learning outcome 1: Maintain brake system. (30%)	1.1. The brake system is appropriately identified according to their types	The brake system is appropriately identified			1
	1.2. Brake system components are appropriately identified according to their types	Brake system components are appropriately identified			1
	1.3. Brake system components is appropriately described according to their types	Brake system components is appropriately described			3
	1.4. Tools, materials, and equipment are properly selected according to the work to be done	Tools, materials, and equipment are properly selected			1
	1.5. The brake system is properly inspected according to the manufacturer's instructions	The brake system is properly inspected			2
	1.6. The brake system components	The brake system components are			3

	are appropriately dismounted according to the repair procedures	appropriately dismounted			
	1.7. The brake system components are appropriately disassembled according to the repair manual	The brake system components are appropriately disassembled			3
	1.8. The brake system is properly cleaned/inspected according to the manufacturer's instructions	The brake system is properly cleaned/inspected			3
	1.9. The brake system damaged components are properly replaced/adjusted/rectified according to damaged parts	The brake system damaged components are properly replaced/adjusted/rectified			3
	1.10. The brake system components are properly reassembled according to the manufacturer instructions	The brake system components are properly reassembled			3
	1.11. The brake system components are properly remounted according to the repair manual	The brake system components are properly remounted			3
	1.12. Brake system is properly bled and refilled according to the manufacturer instructions	Brake system is properly bled and refilled			2
	1.13. The brake system is correctly tested according to the repair manual	The brake system is correctly tested			2
2. Learning outcome 2: Maintain steering system. (40%)	2.1. The steering system is appropriately identified according to their control type	The steering system is appropriately identified			2
	2.2. The steering system components are appropriately identified according to their types	The steering system components are appropriately identified			2
	2.3. Type steering system components are appropriately described according to their types	Type steering system components are appropriately described			4
	2.4. Tools, materials, and equipment are properly selected according to the work to be done.	Tools, materials, and equipment are properly selected			2

	2.5. Steering system is properly inspected according to the manufacturer's instruction	Steering system is properly inspected			4
	2.6. The steering system components are appropriately dismantled according to the repair procedures	The steering system components are appropriately dismantled			4
	2.7. The steering system components are appropriately disassembled according to the repair procedures	The steering system components are appropriately disassembled			4
	2.8. The steering system components are correctly cleaned and inspected according to the manufacturer instructions	The steering system components are correctly cleaned and inspected			4
	2.9. The steering system damaged components are replaced/adjusted according to the damaged parts	The steering system damaged components are replaced/adjusted			4
	2.10. The steering system components are appropriately reassembled according to the manufacturer instructions	The steering system components are appropriately reassembled			4
	2.11. The steering system components are appropriately remounted according to the manufacturer instructions	The steering system components are appropriately remounted			4
	2.12. The steering system is correctly tested based on the functionality	The steering system is correctly tested			2
3. Learning outcome 3: Maintain suspension system.	3.1. The suspension system is appropriately identified according to their types.	The suspension system is appropriately identified			1
	3.2. The suspension system components are appropriately identified according to their	The suspension system components are appropriately identified			2

(30%)	types				
	3.3. Type suspension system components are appropriately described according to their types	Type suspension system components are appropriately described			3
	3.4. Tools, materials, and equipment are properly selected according to the type of manufacturer instructions	Tools, materials, and equipment are properly selected			1
	3.5. The suspension system components are appropriately inspected according to the repair manuals	The suspension system components are appropriately inspected			3
	3.6. The suspension system components are adequately dismounted according to the repair manuals	The suspension system components are adequately dismounted			3
	3.7. The suspension system components are appropriately disassembled according to the manufacturer instructions	The suspension system components are appropriately disassembled			3
	3.8. The suspension system components are correctly cleaned according to the manufacturer instructions	The suspension system components are correctly cleaned			3
	3.9. The suspension system damaged components are replaced /adjusted according to damaged parts	The suspension system damaged components are replaced /adjusted			3
	3.10. The suspension system components are appropriately reassembled according to the manufacturer instructions	The suspension system components are appropriately reassembled			3
	3.11. The suspension system components are appropriately remounted according to the	The suspension system components are appropriately remounted			3

	manufacturer instructions.				
	3.12. The suspension system is correctly tested based on the functionality	The suspension system is correctly tested			2
Total marks					**100**
Percentage Weightage					**100%**
Minimum Passing line % (Aggregate): 70%					

References:

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2. Automotive technology volume a systems approach 5th edition Jack Erjavec, 2009
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4. Modern automotive technology Europa Lehmetel 2nd edition, 2011
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