



AUTOMOTIVE SERVICING (ENGINE AND CHASSIS REPAIRS)

TECHNICAL-PROFESSIONAL

Grade 12

**Three-Term Budget Of Work (BOW)
for Learning Competencies**

**TECHNICAL-PROFESSIONAL
AUTOMOTIVE AND SMALL ENGINE TECHNOLOGIES
Grade 12**

**Three-Term Budget Of Work
For Learning Competencies**

Please note that each Tech-Pro elective is completed in one term if delivered at Grade 12.

Elective	Automotive Servicing (Engine and Chassis Repairs)
Prerequisite	Driving and Automotive Servicing
Content Standard	Demonstrate an understanding of the concepts, principles and processes of automotive engine repair.
Performance Standard	The learners perform automotive repair of engine cooling system, lubricating systems, intake and exhaust systems, overhaul mechanical systems, and costing of services employing appropriate safety precautions.

Week	Learning Competency	Suggested Activities
1	Discuss the overview of automotive engine repair	Engine Repair Process Mapping - This activity helps learners understand the overall process of automotive engine repair—from diagnosis to testing—by creating a group flowchart that shows the systematic repair

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		stages in a workshop setting. ○ Learners collaborate in groups to create and present a flowchart showing the step-by-step process of automotive engine repair from diagnosis to final testing. ● Engine Repair Tools and Procedures Case Study Discussion ○ In this activity, learners analyze an engine problem scenario and discuss repair steps, required tools, safety measures, and possible causes to strengthen diagnostic and repair skills. ○ Learners examine a given engine problem scenario and discuss the possible causes, tools needed, and basic repair steps in a guided class discussion.
	● Perform procedures in repairing engine cooling system	● Cooling System Inspection and Diagnosis Workshop ○ This hands-on activity lets learners inspect and diagnose an engine cooling system, checking components, coolant levels, leaks, and signs of overheating while practicing proper procedures and safety. ○ Learners perform a guided inspection of an engine cooling system, identify

Week	Learning Competency	Suggested Activities
		faults, and document their findings using a checklist. • Cooling System Repair Simulation (Thermostat/Radiator Hose Replacement) ○ In this activity, learners replace a faulty cooling system component, following proper procedures for removal, installation, refilling, and leak checks while practicing safe tool use and coolant handling. ○ Learners follow step-by-step procedures to replace a cooling system component and test the system for proper operation afterward.
2	• Perform procedures in repairing lubricating system	• Engine Oil and Filter Replacement Practicum ○ This hands-on activity lets learners change engine oil and replace the oil filter, identifying components, performing the procedure safely, and checking for leaks. ○ Learners perform a complete engine oil and filter change following standard safety and repair procedures. • Lubricating System Fault Diagnosis and Repair Simulation

Week	Learning Competency	Suggested Activities
		○ In this activity, learners diagnose and repair common lubricating system problems using tools and proper procedures, focusing on systematic troubleshooting and correct repair steps. ○ Learners diagnose a simulated lubricating system problem and carry out the appropriate repair procedure.
	● Perform procedures in repairing the engine intake and exhaust system	● Intake and Exhaust System Inspection and Leak Detection Practicum ○ This hands-on activity lets learners inspect engine intake and exhaust systems for faults, identify components, and practice proper inspection, tool use, and safety. ○ Learners systematically inspect the intake and exhaust systems, identify defects, and record recommended repairs using a checklist. ● Intake/Exhaust Component Replacement Simulation ○ In this activity, learners replace a faulty intake or exhaust component, following proper procedures, torque specifications, and safety checks. ○ Learners follow standard repair procedures to remove and replace a

Week	Learning Competency	Suggested Activities
		defective intake or exhaust component and test the system afterward.
3	Perform procedures in overhauling the engine mechanical system	Engine Disassembly and Parts Inspection Practicum - This hands-on activity lets learners disassemble an engine for overhaul, inspect major components for wear or damage, and practice proper sequencing, labeling, and safety. - Learners carefully disassemble an engine, inspect and measure components, and record their findings following standard overhaul procedures. Engine Reassembly and Timing Alignment Workshop - In this activity, learners reassemble an overhauled engine by installing major components, applying correct torque and lubrication, aligning timing marks, and ensuring accuracy according to manufacturer specifications. - Learners reassemble the engine according to manufacturer specifications and verify proper timing and torque settings.

Week	Learning Competency	Suggested Activities
4	Calculate the service cost for engine services	Engine Service Cost Estimation Workshop - This activity teaches learners to compute the total cost of engine services by identifying labor, parts, and other expenses, and preparing a basic service cost estimate used in automotive repair shops. - Learners compute the total service cost using a given list of parts prices and labor rates, then prepare a written cost estimate. Automotive Repair Shop Simulation – Customer Billing Activity - Learners act as service technicians preparing a customer invoice for an engine repair, computing parts, labor, taxes, and the total amount due while practicing accurate and proper shop billing procedures. - Learners prepare and compute a complete service invoice based on a given engine repair scenario.

Suggested Performance Tasks	• Individual Task: Engine System Repair and Costing Exercise ○ This individual task requires learners to diagnose a given engine problem (e.g., cooling system leak, low oil pressure, faulty exhaust gasket), perform the appropriate repair procedures, and calculate the total service cost including labor, parts, and consumables. The task emphasizes proper tool usage, safety precautions, and accurate service costing. ○ Individually diagnose, repair a given engine system fault, and compute the total service cost following safety and procedural standards. • Group Task: Engine Overhaul Workshop Simulation ○ In this group task, learners collaboratively perform a complete engine mechanical overhaul on a training engine, including disassembly, inspection, repair or replacement of worn components, reassembly, and functional testing. Each group member is assigned specific roles to practice teamwork, sequencing, tool handling, and adherence to safety standards. ○ In groups, perform an engine overhaul from disassembly to reassembly and testing, following proper procedures and safety precautions.
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Content Standard	Demonstrate an understanding of the concepts, principles and processes of automotive chassis repair.
Performance Standard	The learners perform automotive repair of drive lines, clutch system, manual transmission/transaxle, differential, brake system, steering system, suspension system and costing of services employing appropriate safety precautions.

Week	Learning Competency	Suggested Activities
4	• Discuss the overview of automotive chassis repair	• Chassis Components Identification and Function Mapping

Week	Learning Competency	Suggested Activities
		○ This activity introduces learners to the main components of an automotive chassis, such as the frame, suspension, steering system, axles, and wheels. Students identify each part, discuss its function, and create a visual map showing how the components work together to support the vehicle and ensure safe operation. ○ Learners identify chassis components, explain their functions, and create a diagram showing their interconnections. ● Automotive Chassis Repair Process Flowchart ○ In this activity, learners discuss the step-by-step process of repairing a vehicle chassis, including damage assessment, measurement, alignment, part replacement, welding, and finishing. Students work in groups to develop a flowchart that illustrates the systematic repair procedures used in automotive workshops. ○ Learners create a group flowchart showing the step-by-step process of automotive chassis repair from inspection to finishing.

5	Perform the procedures in troubleshooting drive lines.	Drive Line Component Inspection and Fault Identification - This hands-on activity allows learners to inspect drive line components such as the driveshaft, universal joints (U-joints), CV joints, axles, and differential for wear, damage, or misalignment. They learn to identify symptoms of common faults like vibrations, unusual noises, and grease leaks. - Learners inspect drive line components and identify faults using observation, measurement tools, and testing techniques. Drive Line Troubleshooting Simulation - In this activity, learners work in groups to troubleshoot a simulated drive line problem on a training vehicle or mock setup. They follow a systematic procedure to detect the source of vibration, noise, or misalignment, recommend repairs, and verify proper operation after corrective action. - Learners systematically troubleshoot a drive line problem, identify the cause, and propose or perform corrective repairs.
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6	Perform the procedures in troubleshooting the clutch system.	Clutch System Component Inspection - This hands-on activity allows learners to inspect clutch components such as the clutch disc, pressure plate, release bearing, flywheel, and clutch pedal mechanism. They identify common faults like slipping, dragging, unusual noises, or improper engagement. - Learners inspect clutch system components and identify faults through observation, measurement, and functional testing. Clutch System Troubleshooting Simulation - In this activity, learners work individually or in groups to troubleshoot a simulated clutch problem. They follow systematic steps to diagnose the cause of issues such as slipping, difficulty in gear shifting, or pedal abnormalities, and recommend appropriate repairs or adjustments. - Learners systematically troubleshoot a clutch problem, determine the cause, and suggest or perform corrective actions.

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6 - 7	Perform the procedures in troubleshooting and overhauling manual transmission/transaxle.	Manual Transmission Component Inspection and Fault Diagnosis - This hands-on activity allows learners to inspect the major components of a manual transmission or transaxle, including gears, synchronizers, bearings, shafts, and shift linkages. They identify common faults such as gear slipping, grinding, or difficulty in shifting and record their observations. - Learners inspect transmission components and diagnose faults through observation, measurement, and functional testing. Manual Transmission/Transaxle Overhaul Simulation - In this activity, learners perform a simulated overhaul of a manual transmission or transaxle. They disassemble the unit, inspect and measure components for wear or damage, replace defective parts, reassemble, and test the unit for proper operation, while observing proper procedures and safety precautions. - Learners systematically disassemble, inspect, repair, and reassemble a manual transmission/transaxle,

Week	Learning Competency	Suggested Activities
		ensuring proper function and safety compliance.
7	Perform procedures in troubleshooting differential.	Differential Component Inspection and Fault Identification - This hands-on activity allows learners to examine differential components, including the ring and pinion gears, bearings, housing, and axle shafts. They identify common faults such as unusual noise, vibration, oil leaks, or excessive play in gears. - Learners inspect differential components and identify faults through observation, measurement, and functional testing. Differential Troubleshooting Simulation - In this activity, learners work individually or in groups to troubleshoot a simulated differential problem. They follow a systematic procedure to detect issues, determine the cause, and recommend corrective actions such as adjustments, part replacement, or lubrication. - Learners systematically troubleshoot a differential, identify the cause of faults, and suggest or perform

Week	Learning Competency	Suggested Activities
		corrective actions.
8	Perform procedures in troubleshooting the brake system.	Brake System Component Inspection - This hands-on activity allows learners to inspect the brake system, including brake pads/shoes, discs/drums, calipers, wheel cylinders, brake lines, and fluid levels. They identify common faults such as worn pads, leaks, air in the system, or unusual noises. - Learners inspect brake system components and identify faults using observation, measurement, and functional testing. Brake System Troubleshooting Simulation - In this activity, learners work individually or in groups to troubleshoot a simulated brake system problem. They follow a systematic procedure to detect issues, determine the cause, and recommend or perform corrective actions such as pad replacement, bleeding, or fluid topping. - Learners systematically troubleshoot a brake system, identify the cause of faults, and perform or recommend

Week	Learning Competency	Suggested Activities
		corrective repairs.
9	Perform procedures in troubleshooting the steering system.	Steering System Component Inspection - This hands-on activity allows learners to inspect major steering components, including the steering wheel, column, rack and pinion, tie rods, ball joints, and power steering system. They identify common faults such as excessive play, unusual noises, fluid leaks, or misalignment. - Learners inspect steering system components and identify faults using observation, measurement, and functional tests. Steering System Troubleshooting Simulation - In this activity, learners work individually or in groups to troubleshoot a simulated steering system problem. They follow systematic procedures to detect the cause of issues such as difficulty turning, vibrations, or fluid leaks, and recommend or perform corrective repairs. - Learners systematically troubleshoot a steering system, identify the problem, and suggest or perform appropriate

Week	Learning Competency	Suggested Activities
		corrective actions.
10	Perform procedures in troubleshooting the suspension system.	Suspension System Component Inspection - This hands-on activity allows learners to inspect suspension components such as shock absorbers, struts, springs, control arms, bushings, and ball joints. They identify common faults including wear, leakage, unusual noises, or uneven tire wear. - Learners inspect suspension components and identify faults using observation, measurement, and functional testing. Suspension System Troubleshooting Simulation - In this activity, learners work individually or in groups to troubleshoot a simulated suspension problem. They follow systematic procedures to detect issues like excessive bounce, vibration, or misalignment, and recommend or perform corrective repairs. - Learners systematically troubleshoot a suspension system, determine the cause of faults, and perform or

Week	Learning Competency	Suggested Activities
		recommend corrective actions.
11	Discuss vehicle releasing procedures	Vehicle Release Procedure Demonstration - This activity introduces learners to the standard steps involved in releasing a vehicle after servicing, including final inspection, checking completed repairs, ensuring safety, verifying documentation, and confirming customer instructions. - Learners observe or demonstrate the proper sequence of steps for safely releasing a serviced vehicle. Vehicle Release Process Flowchart - In this activity, learners work in groups to create a flowchart showing the complete vehicle release process, from final inspection to handing over the vehicle to the customer, emphasizing safety, documentation, and verification procedures. - Learners create a group flowchart illustrating the step-by-step procedures for safely releasing a serviced vehicle.

Week	Learning Competency	Suggested Activities
11	Calculate the cost of chassis services	Individual Chassis Service Cost Calculation - This activity allows learners to calculate the total cost of a chassis service, including labor, parts, consumables, and any applicable taxes, based on a given service scenario. It develops accuracy in computation and understanding of service pricing. - Learners individually compute the total cost of a chassis service using provided parts, labor rates, and consumables. Group Chassis Service Billing Simulation - In this activity, learners work in groups to prepare a complete service invoice for a simulated chassis repair, considering labor charges, parts replacement, and additional service fees. The task emphasizes teamwork, accuracy, and real-world billing practices. - Learners collaborate to calculate and prepare a complete service invoice for

Week	Learning Competency	Suggested Activities
		a simulated chassis repair.
Suggested Performance Tasks	Individual Task: Brake System Diagnosis and Service Costing - This individual task requires learners to inspect and diagnose faults in a vehicle's brake system, perform necessary repairs (e.g., pad/shoe replacement, bleeding brakes, checking fluid), and calculate the total service cost including labor, parts, and consumables. The task emphasizes safety, accurate repair, and proper documentation. - Individually inspect, repair, and service a brake system, then compute the total cost following safety procedures. Group Task: Drivetrain and Suspension System Overhaul Simulation - In this group task, learners collaboratively work on a training vehicle to repair or overhaul the drive lines, clutch system, manual transmission/transaxle, differential, steering, and suspension systems. Each member is assigned roles to perform inspections, repairs, adjustments, and testing while practicing teamwork, correct tool usage, and safety standards. - In groups, perform inspection, repair, and testing of drivetrain and suspension systems on a training vehicle while following proper procedures and safety precautions.	