Small Engines Curriculum Guide
Draft

Idaho Division of Professional Technical Education
650 West State Street
Boise, ID 83720

2008
SMALL ENGINE REPAIR

Small Engine Repair – Level I

COURSE DESCRIPTION:

Basic Workplace Safety and First-Aid Skills – The student will be able to:

- Follow all shop rules.
- Complete shop safety pledge form.
- Complete shop safety inspection checklist.
- Maintain safe and orderly shop.
- Operate fire extinguisher.
- Store flammable and toxic substances.
- Handle flammable and toxic substances.
- Lift heavy objects.
- Move heavy objects.
- Demonstrate class rules, safety, and SMENG101 affective competencies.
- Define Safety terms.
- Interpret MSDS.
- Identify fire safety.
- Determine basic emergency situation first-aid measures.
- Identify shop and classroom rules.
- Demonstrate basic workplace safety knowledge command.

Workplace Ethics – The student will be able to:

- Demonstrate appropriate behavior.
- Demonstrate expected attendance.
- Demonstrate expected punctuality.
- Demonstrate honesty.

Common Hand Tools – The student will be able to:

- Identify basic hand tool usage.
- Determine maintenance procedures.
- Identify basic hand tools.
- Demonstrate common hand tools knowledge command.
- Repair damaged threads using a thread repair kit.

Common Fasteners – The student will be able to:

- Define fastener terms.
- Identify fasteners.
- Select correct fasteners.
- Rethread tapped holes.
- Rethread damaged fasteners.
- Remove seized fasteners.
Demonstrate common fastener knowledge.
Select specific application nonthreaded fasteners.
Select specific application threaded fasteners.
Select seized nut and bolt removal methods.
Demonstrate common fastener knowledge command.

Related Math and Measuring – The student will be able to:

- Define basic engine principle terms.
- Define energy and motion characteristics.
- Calculate work.
- Calculate power.
- Calculate torque.
- Calculate engine displacement.
- Calculate compression ratio.
- Define measuring terms.
- Identify measuring instruments.
- Determine measuring steps.
- Identify Vernier caliper parts.
- Identify outside micrometer parts.
- Identify dial indicator parts.
- Demonstrate measuring knowledge command.
- Read dial indicator settings.
- Read plain micrometer settings.
- Read Vernier caliper settings.
- Read Vernier micrometer settings.
- Use dial indicator.
- Use plain micrometer.
- Use related math.
- Use Vernier caliper.
- Use Vernier micrometer.
- Use a telescoping gauge.
- Demonstrate measuring.

Parts Management, Inventory Control, and Service Orders – The student will be able to:

- Interpret power product equipment reference material illustrations.
- Interpret power product equipment reference material graphs.
- Interpret power product equipment reference material diagrams.
- Interpret power product equipment reference material tables.
- Demonstrate reference material knowledge command.
- Use reference materials.
- Demonstrate reference material competence.
- Demonstrate engine design and identification competence.
- Complete customer estimate.
- Complete service order.
- Use computer parts system.
- Use microfiche system.
- Take a physical inventory of small engine parts.
- Demonstrate parts management, inventory control, service order competence.
Engine Design And Identification – The student will be able to:

- Demonstrate basic engine principles knowledge command.
- Define engine design and identification terms.
- Classify engine designs types.
- Interpret various engine model codes.
- Complete various 4-stroke engine information forms.
- Complete various 2-stroke engine information forms.
- Identify firing order factors.
- Identify engine cooling system types.
- Demonstrate engine design and identification knowledge command.
- Complete an information form on accessories and major units found on an engine.

Basic Engine Principles and Design – The student will be able to:

- Calculate problems using the formula for work.
- Calculate problems using the formula for horsepower.
- Calculate problems using the formula for torque.
- Calculate problems using the formula for engine cubic inch displacement.
- Calculate problems using the formula for compression ratio.

Basic Engine Principles of Operation of a 2-Stroke Engine – The student will be able to:

- Define 2-stroke engine terms.
- Define 2-stroke engine operations.
- Identify 2-stroke engine components.
- Identify multi-piece crankshaft parts.
- Demonstrate 2-stroke engine operation knowledge command.
- Analyze 2-cycle engine operation.
- Analyze 4-cycle engine operation.
- Diagnose engine problems.
- Demonstrate engine operation competence.
- Determine engine condition.
- Disassemble 2-stroke engine.
- Inspect 2-stroke engine.
- Service 2-stroke engine.
- Reassemble 2-stroke engine.

Basic Engine Principles of Operations of a 4-Stroke Engine – The student will be able to:

- Define 4-stroke engine terms.
- Define 4-stroke engine operations.
- Identify 4-stroke engine parts.
- Explain valve timing and overlap theory.
- Demonstrate 4-stroke engine operation knowledge command.
- Analyze 2-cycle engine operation.
- Analyze 4-cycle engine operation.
- Diagnose engine problems.
- Demonstrate engine operation competence.
Inspect internal components.
Service 4-stroke valve assembly.
Service connecting rod.
Service crankcase.
Service crankshaft.
Inspect cylinder.
Service cylinder.
Service piston.
Service rings.
Machine engine components.
Reassemble 4-stroke engine.

Overhaul Four-Stroke Cycle Engine – The student will be able to:

Define engine overhaul terms.
Identify engine parts.
Diagnose various engine problems.
Demonstrate engine overhaul knowledge command.
Demonstrate engine overhaul competence.
Perform failure analysis.
Complete failure-analysis checklist.
Evaluate engine failure cause.
Demonstrate failure analysis competence.
Disassemble a four-stroke cycle engine.
Inspect and service a cylinder.
Inspect and service the piston, rings, and connecting rod.
Inspect and service a crankshaft and crankcase assembly.
Reassemble a four-stroke cycle engine.
Disassemble 4-stroke engine.
Inspect and service 4-stroke engine.
Inspect internal components.
Inspect and service 4-stroke valve assembly.
Service connecting rod.
Service crankcase.
Service crankshaft.
Inspect and service cylinder.
Machine engine components.
Reassemble 4-stroke cycle engine.

Overhaul Two-Stroke Cycle Engine – The student will be able to:

Define engine overhaul terms.
Identify engine parts.
Diagnose various engine problems.
Demonstrate engine overhaul knowledge command.
Demonstrate engine overhaul competence.
Perform failure analysis.
Complete failure-analysis checklist.
Evaluate engine failure cause.
Demonstrate failure analysis competence.
Disassemble, inspect, and service a two-stroke cycle engine.
Reassemble a two-stroke cycle engine.

Cooling Systems – The student will be able to:

- Remove, clean, and replace air cooled parts.
- Remove, clean, and replace water cooled system parts.
- Demonstrate cooling system competence.

Fuel And Lubrication Systems – The student will be able to:

- Define fuel system terms.
- Identify fuel system components.
- Identify fuel supply system components.
- Identify fuel system supply functions.
- Identify carburetor types.
- Identify fuel filter types.
- Explain fuel pump functions.
- Identify air cleaner types.
- Identify float carburetor parts.
- Identify diaphragm carburetor parts.
- Determine float system functions.
- Determine choke system functions.
- Determine high speed system functions.
- Determine mid-range system functions.
- Determine slow speed functions.
- Determine butterfly throttle functions.
- Determine power/economy functions.
- Determine accelerator pump functions.
- Determine slide valve throttle functions.
- Determine CV functions.
- Determine altitude compensation functions.
- Determine diaphragm chamber metering functions.
- Determine air cleaner functions.
- Identify fuel injection components.
- Determine fuel injection functions.
- Demonstrate fuel systems knowledge command.
- Read engine oil application charts.
- Prepare 2-cycle pre-mix fuel.
- Change engine oil and filter.
- Service crankcase breather assembly.
- Demonstrate lubrication systems competence.
- Classify fuel-system designs.
- Service air filter.
- Remove and replace a float-type carburetor.
- Service a float-type carburetor.
- Remove, service, and replace a diaphragm-type carburetor.
- Remove and replace fuel pump.
- Test and service a fuel pump.
- Replace fuel filter.
Service fuel filter.
Service fuel pump.
Service a sediment bowl fuel strainer.
Demonstrate fuel system competence.
Inspect air-vane governor system.
Inspect mechanical governor system.
Replace internal components of mechanical governor system.
Adjust air-vane governor system.
Adjust mechanical governor system.
Repair air-vane governor system.
Repair mechanical governor system.
Demonstrate governor system competence.

Governor Systems – The student will be able to:

Inspect, adjust, and repair an air vane governor.
Inspect and adjust external components of a mechanical governor with internal flyweights.
Repair internal components of a mechanical governor with internal flyweights.

Basic Electricity – The student will be able to:

Interpret electrical circuit wiring diagrams.
Measure resistance using an Ohm meter.
Check continuity.
Measure circuit amperage.
Check voltage.
Solve problems using Ohm’s Law formula.
Identify basic electrical schematic symbols.
Use an Ohm meter to test for defective diodes.
Use a digital voltammeter.
Demonstrate basic electrical principle competence.
Test ignition system.
Replace breaker points and condenser.
Service armature.
Test electronic ignition.
Adjust electronic ignition.
Adjust ignition timing.
Check ignition timing.
Service breaker points and condenser.

Ignition System – The student will be able to:

Inspect ignition system.
Remove, service, and replace spark plugs.
Remove and replace contact points and condensers.
Service flywheel.
Perform coil power test.
Test the coil, condenser, armature, and flywheel magnets.
Test and adjust a solid state ignition system.
Demonstrate ignition system competence.
Check ignition timing using a dial indicator.
Test condenser for leakage or short.

Charging System – The student will be able to:

Remove and replace an alternator.
Disassemble, check, and reassemble an alternator.

Starting System – The student will be able to:

Service recoil starting system.
Troubleshoot DC electric starting system.
Test DC electric starting system.
Service DC electric starting system.
Replace DC electric starting system.
Demonstrate starting system competence.
Test flywheel-alternator charging system.
Service flywheel-alternator charging system.
Remove, disassemble, test, service and reassemble a starter.
Replace starter rewind spring.
Service the vertical pull starter.
Demonstrate charging system competence.

Exhaust System – The student will be able to:

Service 2-stroke exhaust system.
Service 4-stroke exhaust system.
Replace 2-stroke exhaust system.
Replace 4-stroke exhaust system.
Remove, service, and replace two-cycle exhaust system components.
Demonstrate exhaust system competence.

Troubleshooting – The student will be able to:

Troubleshoot charging system.
Troubleshoot the ignition system.
Troubleshoot the fuel system.
Troubleshoot engine condition.
Troubleshoot engine compression.
Solve problems using the small engine troubleshooting charts.
Demonstrate troubleshooting competence.
Basic Workplace Safety and First-Aid Skills – The student will be able to:

- Follow all shop rules.
- Complete shop safety pledge form.
- Complete shop safety inspection checklist.
- Maintain safe and orderly shop.
- Operate fire extinguisher.
- Store flammable and toxic substances.
- Handle flammable and toxic substances.
- Lift heavy objects.
- Move heavy objects.
- Demonstrate class rules, safety, and SMENG101 affective competencies.
- Define Safety terms.
- Interpret MSDS.
- Identify fire safety.
- Determine basic emergency situation first-aid measures.
- Identify shop and classroom rules.
- Demonstrate basic work place safety knowledge command.

Workplace Ethics – The student will be able to:

- Demonstrate appropriate behavior.
- Demonstrate expected attendance.
- Demonstrate expected punctuality.
- Demonstrate honesty.

Common Hand Tools – The student will be able to:

- Identify basic hand tool usage.
- Determine maintenance procedures.
- Identify basic hand tools.
- Demonstrate common hand tools knowledge command.
- Repair damaged threads using a thread repair kit.

Common Fasteners – The student will be able to:

- Define fastener terms.
- Identify fasteners.
- Select correct fasteners.
- Rethread tapped holes.
- Rethread damaged fasteners.
- Remove seized fasteners.
- Demonstrate common fastener knowledge.
- Select specific application nonthreaded fasteners.
- Select specific application threaded fasteners.
- Select seized nut and bolt removal methods.
- Demonstrate common fastener knowledge command.
Related Math and Measuring – The student will be able to:

- Define basic engine principle terms.
- Define energy and motion characteristics.
- Calculate work.
- Calculate power.
- Calculate torque.
- Calculate engine displacement.
- Calculate compression ratio.
- Define measuring terms.
- Identify measuring instruments.
- Determine measuring steps.
- Identify Vernier caliper parts.
- Identify outside micrometer parts.
- Identify dial indicator parts.
- Demonstrate measuring knowledge command.
- Read dial indicator settings.
- Read plain micrometer settings.
- Read Vernier caliper settings.
- Read Vernier micrometer settings.
- Use dial indicator.
- Use plain micrometer.
- Use related math.
- Use Vernier caliper.
- Use Vernier micrometer.
- Use a telescoping gauge.
- Demonstrate measuring.

Parts Management, Inventory Control, and Service Orders – The student will be able to:

- Interpret power product equipment reference material illustrations.
- Interpret power product equipment reference material graphs.
- Interpret power product equipment reference material diagrams.
- Interpret power product equipment reference material tables.
- Demonstrate reference material knowledge command.
- Use reference materials.
- Demonstrate reference material competence.
- Demonstrate engine design and identification competence.
- Complete customer estimate.
- Complete service order.
- Use computer parts system.
- Use microfiche system.
- Take a physical inventory of small engine parts.
- Demonstrate parts management, inventory control, service order competence.
Engine Design And Identification – The student will be able to:

- Demonstrate basic engine principles knowledge command.
- Define engine design and identification terms.
- Classify engine designs types.
- Interpret various engine model codes.
- Complete various 4-stroke engine information forms.
- Complete various 2-stroke engine information forms.
- Identify firing order factors.
- Identify engine cooling system types.
- Demonstrate engine design and identification knowledge command.
- Complete an information form on accessories and major units found on an engine.

Cooling Systems – The student will be able to:

- Remove, clean, and replace air cooled parts.
- Remove, clean, and replace water cooled system parts.
- Demonstrate cooling system competence.

Fuel And Lubrication Systems – The student will be able to:

- Define fuel system terms.
- Identify fuel system components.
- Identify fuel supply system components.
- Identify fuel system supply functions.
- Identify carburetor types.
- Identify fuel filter types.
- Explain fuel pump functions.
- Identify air cleaner types.
- Identify float carburetor parts.
- Identify diaphragm carburetor parts.
- Determine float system functions.
- Determine choke system functions.
- Determine high speed system functions.
- Determine mid-range system functions.
- Determine slow speed functions.
- Determine butterfly throttle functions.
- Determine power/economy functions.
- Determine accelerator pump functions.
- Determine slide valve throttle functions.
- Determine CV functions.
- Determine altitude compensation functions.
- Determine diaphragm chamber metering functions.
- Determine air cleaner functions.
- Identify fuel injection components.
- Determine fuel injection functions.
- Demonstrate fuel systems knowledge command.
- Read engine oil application charts.
- Prepare 2-cycle pre-mix fuel.
- Change engine oil and filter.
Service crankcase breather assembly.
Demonstrate lubrication systems competence.
Classify fuel-system designs.
Service air filter.
Remove and replace a float-type carburetor.
Service a float-type carburetor.
Remove, service, and replace a diaphragm-type carburetor.
Remove and replace fuel pump.
Test and service a fuel pump.
Replace fuel filter.
Service fuel filter.
Service fuel pump.
Service a sediment bowl fuel strainer.
Demonstrate fuel system competence.
Inspect air-vane governor system.
Inspect mechanical governor system.
Replace internal components of mechanical governor system.
Adjust air-vane governor system.
Adjust mechanical governor system.
Repair air-vane governor system.
Repair mechanical governor system.
Demonstrate governor system competence.

Governor Systems – The student will be able to:

- Inspect, adjust, and repair an air vane governor.
- Inspect and adjust external components of a mechanical governor with internal flyweights.
- Repair internal components of a mechanical governor with internal flyweights.

Basic Electricity – The student will be able to:

- Interpret electrical circuit wiring diagrams.
- Measure resistance using an Ohm meter.
- Check continuity.
- Measure circuit amperage.
- Check voltage.
- Solve problems using Ohm’s Law formula.
- Identify basic electrical schematic symbols.
- Use an Ohm meter to test for defective diodes.
- Use a digital voltammeter.
- Demonstrate basic electrical principle competence.
- Test ignition system.
- Replace breaker points and condenser.
- Service armature.
- Test electronic ignition.
- Adjust electronic ignition.
- Adjust ignition timing.
- Check ignition timing.
- Service breaker points and condenser.
Ignition System – The student will be able to:

- Inspect ignition system.
- Remove, service, and replace spark plugs.
- Remove and replace contact points and condensers.
- Service flywheel.
- Perform coil power test.
- Test the coil, condenser, armature, and flywheel magnets.
- Test and adjust a solid state ignition system.
- Demonstrate ignition system competence.
- Check ignition timing using a dial indicator.
- Test condenser for leakage or short.

Charging System – The student will be able to:

- Remove and replace an alternator.
- Disassemble, check, and reassemble an alternator.

Starting System – The student will be able to:

- Service recoil starting system.
- Troubleshoot DC electric starting system.
- Test DC electric starting system.
- Service DC electric starting system.
- Replace DC electric starting system.
- Demonstrate starting system competence.
- Test flywheel-alternator charging system.
- Service flywheel-alternator charging system.
- Remove, disassemble, test, service and reassemble a starter.
- Replace starter rewind spring.
- Service the vertical pull starter.
- Demonstrate charging system competence.

Troubleshooting – The student will be able to:

- Troubleshoot charging system.
- Troubleshoot the ignition system.
- Troubleshoot the fuel system.
- Troubleshoot engine condition.
- Troubleshoot engine compression.
- Solve problems using the small engine troubleshooting charts.
- Demonstrate troubleshooting competence.

Overhaul Four-Stroke Cycle Engine – The student will be able to:

- Define engine overhaul terms.
- Identify engine parts.
- Diagnose various engine problems.
- Demonstrate engine overhaul knowledge command.
- Demonstrate engine overhaul competence.
Perform failure analysis.
Complete failure-analysis checklist.
Evaluate engine failure cause.
Demonstrate failure analysis competence.
Disassemble a four-stroke cycle engine.
Inspect and service a cylinder.
Inspect and service the piston, rings, and connecting rod.
Inspect and service a crankshaft and crankcase assembly.
Reassemble a four-stroke cycle engine.
Disassemble 4-stroke engine.
Inspect and service 4-stroke engine.
Inspect internal components.
Inspect and service 4-stroke valve assembly.
Service connecting rod.
Service crankcase.
Service crankshaft.
Inspect and service cylinder.
Machine engine components.
Reassemble 4-stroke cycle engine.

Overhaul Two-Stroke Cycle Engine – The student will be able to:

Define engine overhaul terms.
Identify engine parts.
Diagnose various engine problems.
Demonstrate engine overhaul knowledge command.
Demonstrate engine overhaul competence.
Perform failure analysis.
Complete failure-analysis checklist.
Evaluate engine failure cause.
Demonstrate failure analysis competence.
Disassemble, inspect, and service a two-stroke cycle engine.
Reassemble a two-stroke cycle engine.
Small Engine Repair – Level 3

Basic Workplace Safety and First-Aid Skills – The student will be able to:

Follow all shop rules.
Complete shop safety pledge form.
Complete shop safety inspection checklist.
Maintain safe and orderly shop.
Operate fire extinguisher.
Store flammable and toxic substances.
Handle flammable and toxic substances.
Lift heavy objects.
Move heavy objects.
Demonstrate class rules, safety, and SMENG101 affective competencies.
Define Safety terms.
Interpret MSDS.
Identify fire safety.
Determine basic emergency situation first-aid measures.
Identify shop and classroom rules.
Demonstrate basic work place safety knowledge command.

Workplace Ethics – The student will be able to:

Demonstrate appropriate behavior.
Demonstrate expected attendance.
Demonstrate expected punctuality.
Demonstrate honesty.

Common Hand Tools – The student will be able to:

Identify basic hand tool usage.
Determine maintenance procedures.
Identify basic hand tools.
Demonstrate common hand tools knowledge command.
Repair damaged threads using a thread repair kit.

Common Fasteners – The student will be able to:

Define fastener terms.
Identify fasteners.
Select correct fasteners.
Rethread tapped holes.
Rethread damaged fasteners.
Remove seized fasteners.
Demonstrate common fastener knowledge.
Select specific application nonthreaded fasteners.
Select specific application threaded fasteners.
Select seized nut and bolt removal methods.
Demonstrate common fastener knowledge command.
Related Math and Measuring – The student will be able to:

- Define basic engine principle terms.
- Define energy and motion characteristics.
- Calculate work.
- Calculate power.
- Calculate torque.
- Calculate engine displacement.
- Calculate compression ratio.
- Define measuring terms.
- Identify measuring instruments.
- Determine measuring steps.
- Identify Vernier caliper parts.
- Identify outside micrometer parts.
- Identify dial indicator parts.
- Demonstrate measuring knowledge command.
- Read dial indicator settings.
- Read plain micrometer settings.
- Read Vernier caliper settings.
- Read Vernier micrometer settings.
- Use dial indicator.
- Use plain micrometer.
- Use related math.
- Use Vernier caliper.
- Use Vernier micrometer.
- Use a telescoping gauge.
- Demonstrate measuring.

Parts Management, Inventory Control, and Service Orders – The student will be able to:

- Interpret power product equipment reference material illustrations.
- Interpret power product equipment reference material graphs.
- Interpret power product equipment reference material diagrams.
- Interpret power product equipment reference material tables.
- Demonstrate reference material knowledge command.
- Use reference materials.
- Demonstrate reference material competence.
- Demonstrate engine design and identification competence.
- Complete customer estimate.
- Complete service order.
- Use computer parts system.
- Use microfiche system.
- Take a physical inventory of small engine parts.
- Demonstrate parts management, inventory control, service order competence.
Engine Design And Identification – The student will be able to:

- Demonstrate basic engine principles knowledge command.
- Define engine design and identification terms.
- Classify engine designs types.
- Interpret various engine model codes.
- Complete various 4-stroke engine information forms.
- Complete various 2-stroke engine information forms.
- Identify firing order factors.
- Identify engine cooling system types.
- Demonstrate engine design and identification knowledge command.
- Complete an information form on accessories and major units found on an engine.

Cooling Systems – The student will be able to:

- Remove, clean, and replace air cooled parts.
- Remove, clean, and replace water cooled system parts.
- Demonstrate cooling system competence.

Fuel And Lubrication Systems – The student will be able to:

- Define fuel system terms.
- Identify fuel system components.
- Identify fuel supply system components.
- Identify fuel system supply functions.
- Identify carburetor types.
- Identify fuel filter types.
- Explain fuel pump functions.
- Identify air cleaner types.
- Identify float carburetor parts.
- Identify diaphragm carburetor parts.
- Determine float system functions.
- Determine choke system functions.
- Determine high speed system functions.
- Determine mid-range system functions.
- Determine slow speed functions.
- Determine butterfly throttle functions.
- Determine power/economy functions.
- Determine accelerator pump functions.
- Determine slide valve throttle functions.
- Determine CV functions.
- Determine altitude compensation functions.
- Determine diaphragm chamber metering functions.
- Determine air cleaner functions.
- Identify fuel injection components.
- Determine fuel injection functions.
- Demonstrate fuel systems knowledge command.
- Read engine oil application charts.
- Prepare 2-cycle pre-mix fuel.
- Change engine oil and filter.
Service crankcase breather assembly.
Demonstrate lubrication systems competence.
Classify fuel-system designs.
Service air filter.
Remove and replace a float-type carburetor.
Service a float-type carburetor.
Remove, service, and replace a diaphragm-type carburetor.
Remove and replace fuel pump.
Test and service a fuel pump.
Replace fuel filter.
Service fuel filter.
Service fuel pump.
Service a sediment bowl fuel strainer.
Demonstrate fuel system competence.
Inspect air-vane governor system.
Inspect mechanical governor system.
Replace internal components of mechanical governor system.
Adjust air-vane governor system.
Adjust mechanical governor system.
Repair air-vane governor system.
Repair mechanical governor system.
Demonstrate governor system competence.

Governor Systems – The student will be able to:

Inspect, adjust, and repair an air vane governor.
Inspect and adjust external components of a mechanical governor with internal flyweights.
Repair internal components of a mechanical governor with internal flyweights.

Basic Electricity – The student will be able to:

Interpret electrical circuit wiring diagrams.
Measure resistance using an Ohm meter.
Check continuity.
Measure circuit amperage.
Check voltage.
Solve problems using Ohm’s Law formula.
Identify basic electrical schematic symbols.
Use an Ohm meter to test for defective diodes.
Use a digital voltammeter.
Demonstrate basic electrical principle competence.
Test ignition system.
Replace breaker points and condenser.
Service armature.
Test electronic ignition.
Adjust electronic ignition.
Adjust ignition timing.
Check ignition timing.
Service breaker points and condenser.
Ignition System – The student will be able to:

- Inspect ignition system.
- Remove, service, and replace spark plugs.
- Remove and replace contact points and condensers.
- Service flywheel.
- Perform coil power test.
- Test the coil, condenser, armature, and flywheel magnets.
- Test and adjust a solid state ignition system.
- Demonstrate ignition system competence.
- Check ignition timing using a dial indicator.
- Test condenser for leakage or short.

Charging System – The student will be able to:

- Remove and replace an alternator.
- Disassemble, check, and reassemble an alternator.

Starting System – The student will be able to:

- Service recoil starting system.
- Troubleshoot DC electric starting system.
- Test DC electric starting system.
- Service DC electric starting system.
- Replace DC electric starting system.
- Demonstrate starting system competence.
- Test flywheel-alternator charging system.
- Service flywheel-alternator charging system.
- Remove, disassemble, test, service and reassemble a starter.
- Replace starter rewind spring.
- Service the vertical pull starter.
- Demonstrate charging system competence.

Troubleshooting – The student will be able to:

- Troubleshoot charging system.
- Troubleshoot the ignition system.
- Troubleshoot the fuel system.
- Troubleshoot engine condition.
- Troubleshoot engine compression.
- Solve problems using the small engine troubleshooting charts.
- Demonstrate troubleshooting competence.

Overhaul Four-Stroke Cycle Engine – The student will be able to:

- Define engine overhaul terms.
- Identify engine parts.
- Diagnose various engine problems.
- Demonstrate engine overhaul knowledge command.
- Demonstrate engine overhaul competence.
Perform failure analysis.
Complete failure-analysis checklist.
Evaluate engine failure cause.
Demonstrate failure analysis competence.
Disassemble a four-stroke cycle engine.
Inspect and service a cylinder.
Inspect and service the piston, rings, and connecting rod.
Inspect and service a crankshaft and crankcase assembly.
Reassemble a four-stroke cycle engine.
Disassemble 4-stroke engine.
Inspect and service 4-stroke engine.
Inspect internal components.
Inspect and service 4-stroke valve assembly.
Service connecting rod.
Service crankcase.
Service crankshaft.
Inspect and service cylinder.
Machine engine components.
Reassemble 4-stroke cycle engine.

Overhaul Two-Stroke Cycle Engine – The student will be able to:

Define engine overhaul terms.
Identify engine parts.
Diagnose various engine problems.
Demonstrate engine overhaul knowledge command.
Demonstrate engine overhaul competence.
Perform failure analysis.
Complete failure-analysis checklist.
Evaluate engine failure cause.
Demonstrate failure analysis competence.
Disassemble, inspect, and service a two-stroke cycle engine.
Reassemble a two-stroke cycle engine.