

POWER EQUIPMENT TECHNOLOGY 1, 2, 3, 4
COURSE CODES: 6300, 6301, 6302, 6303

COURSE DESCRIPTION: The Power Equipment Technology program is designed to prepare students to perform entry-level maintenance and repair tasks under the supervision of an experienced technician. Students receive training on small internal combustion engines used on portable equipment such as lawn mowers, chain saws, rotary tillers, motorcycles, pumps, compressors, and small outboard engines. The training includes locating and solving problems, using specialized test equipment, overhauling the basic engine, and repairing or replacing engine systems.

OBJECTIVE: Given the necessary equipment, materials, and instruction, students, on completion of the prescribed course of study, will be able to successfully accomplish the following core competencies.

CREDIT: 1 (120 hours), 2 (240 hours)

RESOURCES: [S.C. Instructional Materials](#)

COMPUTER ACCESS: 1 computer per student

MAXIMUM ENROLLMENT: 24

SHOP SAFETY

Proficient professionals know the academic subject matter, including safety as required for proficiency within their area. The following accountability criteria are considered essential for students in the Power Equipment Technology program of study.

1. Demonstrate how to keep a clean, orderly, safe work area.
2. Demonstrate the use of a fire extinguisher.
3. Demonstrate the safe use of hand and power tools.
4. Demonstrate safe dress and use of relevant safety gear and personal protective equipment (PPE).
5. Discuss the importance of Environmental Protection Agency (EPA) regulations/guidelines related to power equipment.
6. Recognize and observe OSHA regulations.

STUDENT ORGANIZATIONS

Proficient professionals know the academic subject matter, including professional development, required for proficiency within their area. The following accountability criteria are considered essential for students in any program of study.

1. Identify the purpose and goals of a Career and Technology Student Organization (CTSO).
2. Explain how CTSOs are integral parts of specific clusters, majors, and/or courses.
3. Explain the benefits and responsibilities of being a member of a CTSO.
4. List leadership opportunities that are available to students through participation in CTSO conferences, competitions, community service, philanthropy, and other activities.
5. Explain how participation in CTSOs can promote lifelong benefits in other professional and civic organizations.

TECHNOLOGY KNOWLEDGE

Proficient professionals know the academic subject matter, including digital citizenship and the ethical use of technology. The following accountability criteria are considered essential for students in any program of study.

1. Demonstrate proficiency and skills associated with the use of technologies that are common to a specific occupation (e.g., keying speed).
2. Identify proper netiquette when using e-mail, social media, and other technologies for communication purposes.
3. Identify potential abuse and unethical uses of laptops, tablets, computers, and/or networks.
4. Explain the consequences of social, illegal, and unethical uses of technology (e.g., cyberbullying, piracy; illegal downloading; licensing infringement; inappropriate uses of software, hardware, and mobile devices in the work environment).
5. Discuss legal issues and the terms of use related to copyright laws, fair use laws, and ethics pertaining to downloading of images, photographs, Creative Commons, documents, video, sounds, music, trademarks, and other elements for personal use.
6. Describe ethical and legal practices of safeguarding the confidentiality of business-and personal-related information.
7. Describe possible threats to a laptop, tablet, computer, and/or network and methods of avoiding attacks.
8. Evaluate various solutions to common hardware and software problems.

PERSONAL QUALITIES AND EMPLOYABILITY SKILLS

Proficient professionals know the academic subject matter, including positive work practices and interpersonal skills, as needed in their role. The following accountability criteria are considered essential for students in any program of study.

1. Demonstrate creativity and innovation.
2. Demonstrate critical thinking and problem-solving skills.
3. Demonstrate initiative and self-direction.

4. Demonstrate integrity.
5. Demonstrate work ethic.
6. Demonstrate conflict resolution skills.
7. Demonstrate listening and speaking skills.
8. Demonstrate respect for diversity.
9. Demonstrate customer service orientation.
10. Demonstrate teamwork.

PROFESSIONAL KNOWLEDGE

Proficient professionals know the academic subject matter, including positive work practices and interpersonal skills. The following accountability criteria are considered essential for students in any program of study.

1. Demonstrate global or “big picture” thinking.
2. Demonstrate career and life management skills and goal-making.
3. Demonstrate continuous learning and adaptability skills to changing job requirements.
4. Demonstrate time and resource management skills.
5. Demonstrates information literacy skills.
6. Demonstrates information security skills.
7. Demonstrates information technology skills.
8. Demonstrates knowledge and use of job-specific tools and technologies.
9. Demonstrate job-specific mathematics skills.
10. Demonstrates professionalism in the workplace.
11. Demonstrate reading and writing skills.
12. Demonstrates workplace safety.

A. PRINCIPLES OF ENGINE OPERATION, TWO- AND FOUR-STROKE ENGINES

Proficient power equipment operators demonstrate appropriate knowledge of two- and four- stroke engines and their components. The following accountability criteria are considered essential for students in the Power Equipment Technology program of study.

1. Identify four-stroke engine components and their operations.
2. Identify two-stroke engine components and their operations.
3. Describe the operation of engine systems.

B. FUEL SYSTEM SERVICE

Proficient power equipment operators demonstrate appropriate skills in the servicing, repair, and maintenance of fuel systems. The following accountability criteria are considered essential for students in the Power Equipment Technology program of study.

1. Service or replace a fuel filter.
2. Clean fuel tank and lines.
3. Service and adjust a vacuum-type carburetor.
4. Service and adjust a float-type carburetor.
5. Service and adjust a diaphragm-type carburetor.
6. Remove and replace a fuel pump.
7. Remove and replace a primer bulb.
8. Identify/test level of ethanol.
9. Remove and replace fuel shut-off switch.
10. Identify and test anti-afterfire solenoid.

C. IGNITION SYSTEM SERVICE

Proficient power equipment operators demonstrate appropriate skills in the servicing, repair, and maintenance of ignition systems. The following accountability criteria are considered essential for students in the Power Equipment Technology program of study.

1. Gauge and replace a spark plug.
2. Remove and replace a flywheel using proper tools.
3. Test and replace an ignition coil.
4. Adjust armature air gap.
5. Test and replace an ignition kill wire.
6. Replace a diode assembly.
7. Troubleshoot a magneto ignition system.
8. Remove and replace a safety switch.
9. Remove and replace a brake-band assembly.

D. ENGINE DISASSEMBLY AND INSPECTION

Proficient power equipment operators demonstrate appropriate skills in performing a failure analysis due to engine wear. The following accountability criteria are considered essential for students in the Power Equipment Technology program of study.

1. Disassemble and inspect engine components.
2. Measure engine wear with precision measuring instruments.
3. Grind valves and valve seats.
4. Lap valves with grinding compound.
5. Deglaze and clean a cylinder.

6. Repair damaged threads using tap and die set.
7. Repair damaged threads using thread insert.
8. Remove and replace oil seals.
9. Replace a crankshaft.
10. Install piston rings.
11. Replace a piston and connecting rod assembly.
12. Install valve lifters.
13. Replace a camshaft.
14. Replace an oil dipper, slinger, or pump.
15. Install a crankcase cover or sump.
16. Adjust and install valves.
17. Install a cylinder head.
18. Service a crankcase breather.
19. Install a short block assembly.

E. MANUAL STARTING SYSTEM SERVICE

Proficient power equipment operators demonstrate appropriate skills in the servicing and repair of starting systems. The following accountability criteria are considered essential for students in the Power Equipment Technology program of study.

1. Remove and replace a starter spring.
2. Remove and replace a starter clutch.
3. Remove and replace a rope/starter pulley.
4. Remove and replace starter pawls.
5. Remove and replace a starter cup.
6. Remove and replace a starter rope.

F. ELECTRICAL SYSTEMS SERVICE

Proficient power equipment operators demonstrate appropriate skills in the servicing and repair of electrical systems. The following accountability criteria are considered essential for students in the Power Equipment Technology program of study.

1. Service, test, and replace a battery.
2. Troubleshoot a starting circuit.
3. Perform a starter amperage draw test.
4. Remove and replace a starter motor.
5. Remove and replace an alternator.
6. Troubleshoot a charging circuit.
7. Remove and replace a voltage regulator.
8. Remove and replace a starter solenoid.
9. Remove and replace an ignition switch.

L. DRIVE SYSTEMS

Proficient power equipment operators demonstrate appropriate skills in servicing, maintaining, and replacing drive systems. The following accountability criteria are considered essential for students in the Power Equipment Technology program of study.

1. Remove and replace a centrifugal clutch.
2. Remove and replace an electric PTO.
3. Repair a belt clutch.
4. Repair and adjust a belt drive assembly.
5. Repair a friction drive system.
6. Change fluid in a hydrostatic transmission.
7. Inspect manual transmission for leaks, noise, and operation.
8. Inspect a differential for leaks, noise, and operation.

M. SHOP SERVICE MANAGEMENT

Proficient power equipment operators demonstrate appropriate skills in shop service management. The following accountability criteria are considered essential for students in the Power Equipment Technology program of study.

1. Determine part numbers from an illustrated parts list.
2. Determine part numbers and pricing using digital media.
3. Complete a work order form.
4. Estimate total cost of repairs.
5. Complete a warranty form.
6. Role-play various customer interactions.

N. LAWN AND GARDEN EQUIPMENT SERVICE

Proficient power equipment operators demonstrate appropriate skills in lawn and garden equipment service and repair. The following accountability criteria are considered essential for students in the Power Equipment Technology program of study.

1. Adjust mower cutting height.
2. Grind and balance a rotary mower blade.
3. Remove and replace a blade adapter.
4. Grease all the zerk fittings on a riding mower.
5. Remove and replace a self-propelled drive wheel.
6. Clean, inspect, and service a riding mower.
7. Remove, replace, adjust, and lubricate a throttle cable.
8. Remove and replace steering rods and bushings.
9. Adjust tow-in on a riding mower.
10. Remove and replace a wheel bearing.
11. Remove and replace a wheel.

12. Remove and repair/replace a tire.
13. Overhaul a mechanical brake caliper.

O. CHAIN SAW SERVICE

Proficient power equipment operators demonstrate appropriate skills in chain saw service and repair. The following accountability criteria are considered essential for students in the Power Equipment Technology program of study.

1. Troubleshoot cutter problems.
2. Sharpen a chain.
3. Inspect and grind depth gauges.
4. Replace a floating sprocket.
5. Replace a clutch and integral sprocket.
6. Lubricate a roller nose bar.
7. Replace and adjust a chain.
8. Remove and replace a guide bar.
9. Remove and replace a manual oiler.
10. Remove and replace an automatic oiler.
11. Remove and replace chain brake assembly.

P. BASIC ENGINE MAINTENANCE

Proficient power equipment operators demonstrate appropriate skills in basic engine servicing and maintenance. The following accountability criteria are considered essential for students in the Power Equipment Technology program of study.

1. Identify EPA laws and regulations in regards to exhaust emissions.
2. Identify engine manufacturer specifications and determine type and weight of oil.
3. Change engine oil.
4. Replace oil filter if required.
5. Dispose oils and gas per EPA regulations.
6. Service or replace a dry element air filter.
7. Service or replace a foam-type air filter.
8. Remove and replace fuel filters.
9. Remove and inspect/replace spark plugs.
10. Clean cooling systems.
11. Remove and inspect the muffler system.
12. Degrease the engine.
13. Inspect various equipment for emission systems.

Q. ELECTRONIC FUEL INJECTION FUNDAMENTALS

Proficient power equipment operators demonstrate fundamental knowledge of electronic fuel injection systems. The following accountability criteria are considered essential for students in the Power Equipment Technology program of study.

1. Identify components and operation of a fuel injection system.
2. Troubleshoot, diagnose, and service using EFI diagnostic equipment.

OPTIONAL UNITS:

R. CUTTING TORCH/WELDING FUNDAMENTALS

Proficient power equipment operators demonstrate fundamental knowledge of cutting torch and welding. The following accountability criteria are considered essential for students in the Power Equipment Technology program of study.

1. Set up an oxyacetylene station.
2. Light and adjust the cutting torch.
3. Set up and adjust a shielded metal arc welding station.
4. Weld a straight bead pattern (flat position).

S. OUTBOARD MOTOR SERVICE

Proficient power equipment operators demonstrate appropriate skills in outboard motor service. The following accountability criteria are considered essential for students in the Power Equipment Technology program of study.

1. Disassemble and clean an outboard engine.
2. Service an outboard engine.
3. Remove, inspect, and install gear drive components.
4. Lubricate an outboard lower unit.
5. Remove, inspect, and install a propeller.
6. Remove, inspect, and install a drive shaft and bearing.
7. Remove, inspect, and install a drive shaft pinion.
8. Remove, inspect, and install a clutch dog.
9. Remove, inspect, and install a water pump impeller.
10. Perform an operational test of the cooling system.
11. Lubricate transom steering bushings.
12. Inspect and pressure test lower unit seals.
13. Check the gas tank for moisture and debris.

T. NEW EMERGING TECHNOLOGIES

Proficient power equipment operators are aware of the impact of new and emerging technologies on power equipment. The following accountability criteria are considered essential for students in the Power Equipment Technology program of study.

1. Explore new and emerging technologies in power equipment usage.
2. Explore the environmental impact of the different types of fuel available in the power equipment industry.

Academic Standards and Indicators

Materials/Resources/Equipment Listing