

Competency Task List – Secondary Component Vehicle Maintenance Technology/Other CIP 47.0699

High School Graduation Years 2023, 2024, 2025

100 Workplace Safety

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
101	Interpret Safety Data Sheets (SDS).		
102	Lift and move heavy objects.		
103	Handle and store flammable materials and toxic substances.		
104	Follow Occupational Safety and Health Administration (OSHA) rules and regulations.		
105	Identify job-site hazards.		
106	Wear personal protective equipment, e.g., safety goggles, hearing protection and respiratory protection.		
107	Select appropriate fire extinguisher according to fire type.		
108	Follow safety rules for Exposure Control Procedures (ECP) for blood borne pathogens.		
109	Use safe work habits while working with electrical systems.		

200 Basic Electrical Principles and Circuit Testing

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
	RESERVED (201)		
202	Interpret electrical circuit and wiring diagrams.		
203	Use a meter to measure resistance, continuity, amperage, and voltage.		
204	Solve problems using Ohm's law.		
205	Follow procedures for battery disposal.		
206	Construct and test series and parallel circuits.		

207	Identify electrical terminals and connectors.		
208	Perform a diode test.		
	RESERVED (209-211)		
212	Inspect, test, and replace fusible links, fuses and circuit breakers.		
213	Identify American Wire Gauge (AWG) wiring codes.		
	RESERVED (214)		
215	Solder a current carrying wire.		

300 Cooling Systems

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
301	Identify the methods of heat transfer and the purpose of a cooling system.		
302	Perform a cooling system flush on a liquid cooled engine.		
303	Remove, service and replace a water pump, hoses, and thermostat.		
304	Identify the components of a liquid cooled engine.		
305	Pressure-test a liquid-cooled cooling system.		
306	Determine causes of engine overheating.		
307	Inspect the cooling system for debris, leaks, and damage.		

400 Fuel Systems

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
401	Identify the types of fuel systems and explain the function of all components.		
	RESERVED (402)		
403	Identify types of carburetor designs.		
	RESERVED (404)		
405	Describe the operation of the idle fuel circuit and the main fuel circuit.		
406	Explain the venturi principle and variable venturi carburetors.		
407	Identify and service fuel enrichment devices.		

	RESERVED (408)		
	RESERVED (409)		
410	Identify the function of electronic fuel injection (EFI) components.		
411	Identify the function and components of gaseous fuel systems.		
412	Identify types and grades of fuels used in internal combustion engines		
413	Describe how fuel additives protect fuel systems.		
414	Remove, service, and replace carburetor.		
	RESERVED (415)		
416	Remove, service, and replace a fuel system's air filter and air intake assembly.		
417	Remove, service, and replace a fuel pump.		
418	Install and adjust throttle and choke linkage.		
419	Adjust carburetor mixture screws per manufacturer specifications.		
420	Adjust carburetor float level and metering levers.		
421	Remove, service and replace a fuel tank, filters, caps, and lines.		
	RESERVED (422)		
423	Check the fuel pump pressure and flow rate.		
424	Pressure test the carburetor.		
425	Check the engine for proper starting, idle and acceleration.		
	RESERVED (426)		
	RESERVED (427)		
428	Remove and replace an intake manifold.		
429	Remove, service and replace electronic fuel injection (EFI) fuel system components.		
430	Diagnose electronic fuel injection (EFI) system failures.		
431	Test and replace an anti-backfire/fuel shutoff solenoid.		

500 Exhaust Systems

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
501	Identify problems that can occur from operating engines with a removed or damaged exhaust system.		
	RESERVED (502)		
503	Remove, service, and replace a spark arrestor screen.		
504	Identify exhaust system components and their functions.		
505	Explain the function of a single stage catalyst (catalytic converters).		
	RESERVED (506)		
507	Remove, service, and replace an exhaust system.		
	RESERVED (508)		

600 Measuring and Trade-Related Mathematics

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
601	Read a standard and a metric ruler.		
602	Read and use a standard and metric micrometer.		
603	Read and use a standard and metric dial indicator.		
604	Use a standard and metric torque wrench.		
605	Use a standard/metric dial caliper.		
606	Calculate displacement and area.		
607	Calculate work, power, torque, and horsepower.		

700 Hand and Power Tools

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
701	Use common hand tools.		
702	Use manufacturer's specialty tools.		
703	Use electric, air, and hydraulic tools.		

800 Fasteners

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
801	Identify, select, and install various fasteners according to specifications.		
802	Replace damaged internal threads using a thread repair system.		
803	Repair damaged threads, using a tap and die, chaser, or thread file.		
804	Use a thread extraction tool to remove a broken fastener.		
805	Torque fasteners according to manufacturer specifications.		

900 Welding, Heating, and Cutting

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
901	Follow safety rules for welding and cutting equipment.		
	RESERVED (902)		
903	Adjust welding amperage and perform various welding repairs.		
	RESERVED (904)		
905	Light and adjust the flame on an oxy-acetylene torch.		
906	Heat and cut with an oxy-acetylene torch.		
907	Set up and adjust gauges on welding, heating, and cutting equipment.		

1000 2-Stroke Cycle Engine

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
1001	Diagnose performance problems in a 2-stroke cycle gasoline engine.		
	RESERVED (1002)		
1003	Perform top end compression test.		
1004	Perform crankcase vacuum/pressure test.		
1005	Identify the component parts in a short block of a 2-stroke cycle engine and explain their purposes.		
1006	Pressure test a fuel system on a 2-stroke cycle engine.		
1007	Explain 2-stroke cycle engine operating theory.		
	RESERVED (1008)		
	RESERVED (1009)		
1010	Identify the types of 2-stroke cycle engine valves.		
1011	Inspect and service 2-stroke cycle engine exhaust systems.		
	RESERVED (1012)		

1100 4-Stroke Cycle Engine

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
1101	Disassemble, clean, and identify engine components.		
	RESERVED (1102)		
1103	Explain 4-stroke cycle engine operating theory.		
	RESERVED (1104)		
1105	Inspect shaft(s) bearings and gears.		
	RESERVED (1106)		
1107	Measure crankshaft end play, run-out and determine necessary repairs.		
1108	Inspect and service valve train components.		
	RESERVED (1109-1111)		

1112	Install valve springs using a valve spring compressor.		
1113	Adjust valve clearances/lash.		
1114	Measure cylinder bore for oversize, out of round, taper, and piston to cylinder wall clearance.		
1115	Deglaze/hone a cylinder.		
1116	Perform a cylinder balance test.		
1117	Perform a cylinder compression test.		
1118	Perform a cylinder leak-down test.		
1119	Install a crankshaft and bearings.		
1120	Install a piston using a ring compressor.		
1121	Check ring end gap and side clearance.		
1122	Verify camshaft timing.		
1123	Install all gaskets and seals according to specifications.		
	RESERVED (1124-1126)		

1200 Engine Failure Analysis

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
1201	List engine failure categories.		
1202	Identify insufficient lubrication failures.		
1203	Identify fuel system failures.		
1204	Identify cooling system failures.		
1205	Identify detonation and pre-ignition failures.		
	RESERVED (1206)		
1207	Identify the effects of over speeding.		
1208	Identify the signature breakage of a connecting rod.		
1209	Identify exhaust port piston scoring and large end bearings failure on a 2-stroke cycle engine.		
1210	Identify the effects of excessing vibration on engine block and mounting base.		
	RESERVED (1211)		

1300 Starting Systems

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
1301	Disassemble, identify, and describe the parts of a recoil starting system.		
	RESERVED (1302)		
1303	Replace a starter spring, pulley, and starter rope.		
	RESERVED (1304)		
1305	Troubleshoot and repair a starting/safety interlock circuit.		
1306	Remove, service and replace a direct current (DC) starter.		
1307	Remove, service and replace an alternating current (AC) starter.		
1308	Identify and describe the components of a direct current (DC) starting system.		
1309	Perform a 12-volt direct current (DC) starter motor current draw test.		
1310	Remove, test, and replace a starter relay or solenoid.		

1400 Ignition System

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
1401	Identify, remove, service, and replace battery ignition system components.		
1402	Identify, remove, service, and replace electronic ignition system components.		
	RESERVED (1403)		
1404	Check and set ignition timing/air gap.		
	RESERVED (1405)		
1406	Test an ignition system using a spark tester.		
1407	Inspect the engine for a sheared flywheel key.		
1408	Remove, inspect, and replace points and condenser.		
	RESERVED (1409)		
1410	Replace a spark plug terminal and boot.		

1411	Test a solid-state, transistor-controlled discharge system.		
1412	Test a capacitive discharge ignition system.		
	RESERVED (1413)		
1414	Perform timing procedures on an engine with a solid state/electronic ignition system.		
	RESERVED (1415)		
1416	Replace an engine ignition kill switch.		

1500 Charging Systems

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
1501	Explain battery theory and perform maintenance and storage procedures.		
1502	Identify and describe the function of charging system components.		
1503	Perform a current draw test.		
1504	Test and troubleshoot the components of a charging system.		
	RESERVED (1505-1507)		
1508	Remove and replace charging system components.		

1600 Lubrication System

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
	RESERVED (1601)		
	RESERVED (1602)		
1603	Change engine oil and filter.		
1604	Select proper oil and grade utilizing application charts.		
1605	Prepare a fuel/oil mixture for a 2-stroke cycle engine.		
1606	Service a crankcase breather assembly.		
1607	Describe lubrication systems and their functions.		

1608	Interpret American Petroleum Institute (API) oil ratings and Society of Automotive Engineers (SAE) viscosity ratings.		
1609	Describe the standard classification of 2-cycle oils.		
1610	List common oil contaminants.		
1611	Identify differences between splash lubrication systems and a pressure lubrication system.		
1612	Describe the operation of oil filtration systems.		
1613	Describe methods of checking the oil level in an engine.		
	RESERVED (1614)		
1615	Identify the components and function of a crankcase ventilation breather assembly		
1616	Perform an oil pressure test.		
1617	Diagnose and repair a low-oil alert system.		

1700 Governor Systems

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
1701	Perform static and dynamic governor adjustments.		
1702	Remove, service, and replace pneumatic and mechanical governor.		
1703	Check top no-load speed and adjust governor as needed.		
1704	Differentiate hunting/surging symptom between the fuel system and governor system.		

1800 Brake Systems

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
1801	Inspect, remove, service, and repair mechanical brake systems.		
1802	Inspect, remove, service, and repair hydraulic brake systems.		
1803	Inspect, remove, service, and repair drum and disc brakes.		
1804	Explain hydraulic brake theory.		

	RESERVED (1805)		
--	-----------------	--	--

1900 Clutch and Drive System

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
1901	Inspect and service or replace belts and tensioning devices.		
1902	Inspect and service or replace centrifugal clutches.		
1903	Inspect and service or replace clutch discs.		
1904	Inspect and service or replace sprockets and chains.		
1905	Inspect and service or replace an electric power take-off.		
1906	Inspect and service or replace universal joints.		
1907	Disassemble, service and reassemble gearboxes and components		
1908	Disassemble, service and reassemble transaxles.		
1909	Disassemble, service and reassemble hydrostatic drives.		
1910	Change hydraulic fluid and filter.		

2000 Parts Management, Invoicing, and Recordkeeping

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
2001	Interpret illustrations, graphs, diagrams, and tables.		
2002	Use reference materials, service manuals, and parts tables.		
2003	Perform inventory of parts in stock.		
2004	Locate parts and specifications using a computerized or microfiche parts reference database.		
2005	Complete a service order/invoice form.		
2006	Interpret time and flat rate information.		
2007	Order materials and supplies.		

2008	Explain a manufacturer's model number, serial number, engine type number, and vehicle identification numbers (VIN).		
------	---	--	--

2100 Wheels and Chassis Service

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
2101	Remove and replace or repair tubeless tire and valve stem.		
2102	Remove and replace or repair a tube type tire.		
2103	Service and replace wheel bearings and bushings.		
2104	Inspect, service, and replace steering components.		
2105	Inspect, service, and repair chassis.		

L2600 Certifications

Item	Task	(X) Indicates Proficiency ¹	Secondary Course Crosswalk
L2601	Obtain EET Four Stroke Certification		
L2602	Obtain EETC Two Stroke Certification		
L2603	Obtain EETC Electrical Certification		
L2604	Obtain EETC Driveline/Hydro Certification		

¹ Student Demonstrated Entry-Level Industry Proficiency as Indicated by (X)

Secondary CTE Instructor Signature _____ Date _____

Student Signature _____ Date _____

[PA In-Demand Occupations List \(PA IDOL\)](#)
[Industry-Recognized Credential Resource Guide](#)