



Automotive Technology

CIP 47.0604

PROGRAM OF STUDY

CURRICULUM MAPPING
WITH
CERTIFICATION OUTCOMES

Mon Valley Career & Technology Center prepares all students to attain their fullest potential for employment, to be life long learners, and to be productive and responsible members of an ever-changing society.

Objective:

This document has been prepared to project student learning outcomes in a linear fashion over the approved 3-year program of study.

Overview:

This document provides a Pennsylvania Department of Education and Mon Valley CTC Occupational Advisory Committee approved list of tasks and learning objectives that are broken out into a linear form for a better understanding of learning outcomes over a three year period within each program. It also serves as curriculum map as students work towards completing knowledge and skill-based tasks in pursuit of industry credentials. The end goal within each program is to work towards completing all tasks at proficient and advanced levels, earning multiple (stackable) industry credentials, and successfully complete the NOCTI exam. Student's progression and completion of task(s) and industry certification(s) may vary.

Navigation:

Unit / Task # - This column indicates the Pennsylvania Department of Education or Mon Valley CTC local unit or task numbers given to each task within a given duty area.

Task Description – This column explains what knowledge-based or skill-based task that a student is working on for completion.

Level / Marking Period – This column indicates the learning level and timeframe at which the specific task(s) will be introduced to the student(s). Note that some tasks may be taught and completed individually while others may be taught in groups. (i.e. 1.1 would signify a first year student being introduced to this task(s) in the first marking period, 2.3 would signify a second year student being introduced to this task(s) in third marking period, etc.)

Industry Certification:

Students successfully progressing through the curriculum and tasks have opportunity to test for industry credentials. Industry credentials are listed on the right side of the document at the appropriate time within the curriculum that a student would be fully prepared to test for that certification.



Automobile/Automotive Mechanics Technology/Technician

Classification of Industrial Programs 47.0604

Unit / Task #	Task Description	Level / Marking Period
101	Explain and follow all lab rules.	1.1
104	Demonstrate auto shop safety and hygiene.	1.1
108	Identify career paths within the career and technical education program.	1.1
201	Identify and follow all safety rules.	1.1
202	Demonstrate the ability to secure vehicles on jack stands and hydraulic lifts.	1.1
204	Identify chemical safety, "Right-To-Know Laws" and Safety Data Sheets (SDS).	1.1
205	Identify and demonstrate the safe use of hand tools.	1.1
206	Identify and demonstrate the safe use of power tools.	1.1
207	Identify and demonstrate the safe use of protective clothing and equipment.	1.1
208	Identify and demonstrate the safe use of fire protection equipment.	1.1
209	Identify and demonstrate the safe use of shop equipment.	1.1
210	Explain EPA and OSHA Regulations.	1.1
304	Demonstrate the ability to correctly use automotive tools.	1.1
102	Participate in basic shop management.	1.2
103	Participate in parts ordering.	1.2
105	Demonstrate the use of service information.	1.2
106	Demonstrate proper telephone courtesy.	1.2
107	Identify vehicle by: sight, V.I.N. and/or ID tag.	1.2
109	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	1.2
110	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	1.2
111	Locate and interpret vehicle and major component identification numbers.	1.2

Certification test for:
 SP/2 – Automotive Safety

Certification test for:
 (ALI) Automotive Lift
 Institute, lift safety

Certification test for:
 (My Career Tech) Basic
 Hand Tools

Certification test for:
 (My Career Tech) Power
 Tools

Certification test for:
 (My Career Tech)
 Specialty tools

Certification test for:
 (My Career Tech) Shop
 Equipment



203	Demonstrate the ability to safely set-up/shut-down oxygen acetylene welding equipment.	1.2
301	Identify and use fasteners and bolts.	1.2
302	Demonstrate the ability to correctly drill and use re-threading tools.	1.2
303	Demonstrate the ability to correctly read and interpret precision automotive measuring tools.	1.2
305	Perform common fastener and thread repairs, to include: remove broken bolt, restore internal and external threads, and repair internal threads with a threaded insert.	1.2
509	Determine proper power steering fluid type; inspect fluid level and condition.	1.2
529	Lubricate suspension and steering systems.	1.2
538	Rotate tires according to manufacturer's recommendations.	1.2
541	Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic).	1.2
542	Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.	1.2
544	Inspect tire and wheel assembly for air loss; perform necessary action.	1.2
545	Repair tire using internal patch.	1.2
606	Check master cylinder for internal/external leaks and proper operation; determine necessary action.	1.2
611	Select, handle, store, and fill brake fluids to proper level.	1.2
612	Inspect, test, and/or replace components of brake warning light system.	1.2
615	Remove, clean, inspect, and measure brake drums; determine necessary action.	1.2
620	Install wheel, torque lug nuts, and make final checks and adjustments.	1.2
630	Check brake pad wear indicator system operation; determine necessary action.	1.2
632	Check vacuum supply to vacuum-type power booster and check power assist operation.	1.2
633	Remove, clean, inspect, repack, and install wheel bearings, RACES and replace seals; install hub and adjust bearings.	1.2
636	Check operation of brake stop light system; determine necessary action.	1.2
645	Describe the operation of a regenerative braking system.	1.2

Certification test for:
(My Career Tech)
Fastening Tools

Certification test for:
(My Career Tech)
Measuring tools

Certification test for:
(My Career Tech) Wheels
and tires



715	Identify location of hybrid vehicle high voltage circuit disconnect (service plug) location and safety procedures.	1.2
716	Perform battery state-of-charge test; determine necessary action.	1.2
717	Perform battery capacity test; confirm proper battery capacity for vehicle application; determine necessary action.	1.2
718	Maintain or restore electronic memory functions.	1.2
719	Inspect, clean, fill, and/or replace battery, battery cables, connectors, clamps, and hold-downs.	1.2
720	Perform battery charge.	1.2
721	Start a vehicle using jumper cables or an auxiliary power supply.	1.2
735	Inspect, replace, and aim headlights and bulbs.	1.2
747	Use a digital multimeter (DMM).	1.2
818	Access and use service information to perform step-by-step diagnosis.	1.2
846	Perform engine oil and filter change.	1.2
902	Verify operation of the instrument panel engine warning indicators.	1.2
1002	Check fluid level and fluid condition in a transmission or a transaxle equipped with a dip-stick.	1.2
1104	Check for system leaks.	1.2
1105	Check and adjust differential housing fluid level.	1.2
502	Identify and interpret suspension and steering system concerns; determine necessary action.	1.3
507	Inspect rack and pinion steering gear; inspect mounting bushings and brackets.	1.3
508	Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.	1.3
510	Flush, fill, and bleed power steering system.	1.3
511	Diagnose power steering fluid leakage; determine necessary action.	1.3
513	Remove and reinstall power steering pump.	1.3
514	Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment.	1.3
515	Inspect and replace power steering hoses and fittings.	1.3
516	Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper.	1.3

Certification to test for:
 (My Career Tech) Motor
 Oil

Certification to test for:
 Valvoline Oil Cert



517	Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps.	1.3
527	Inspect, remove, and replace shock absorbers.	1.3
537	Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action.	1.3
546	Identify indirect and direct tire pressure monitoring systems (TPMS) calibrate system; verify operation of instrument panel lamps.	1.3
547	Identify steps required to remove and replace sensors in a tire pressure monitoring system (TPMS) including relearn procedure.	1.3
602	Identify and interpret brake system concern; determine necessary action.	1.3
607	Remove, bench bleed, and reinstall master cylinder.	1.3
608	Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action.	1.3
609	Replace brake lines, hoses, fittings, and supports.	1.3
610	Fabricate brake lines using proper material and flaring procedures (double flare and ISO types).	1.3
613	Bleed and/or flush brake system.	1.3
614	Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.	1.3
618	Inspect and install wheel cylinders.	1.3
619	Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings.	1.3
622	Remove caliper assembly; inspect for leaks and damage to caliper housing; determine necessary action.	1.3
623	Clean and inspect caliper mounting and slides/pins for operation, wear, and damage; determine necessary action.	1.3
624	Reassemble, lubricate, and reinstall caliper, pads, and related hardware; seat pads, and inspect for leaks.	1.3
634	Check parking brake cables and components including integral parking brake system for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed.	1.3
635	Check parking brake and indicator light system operation; determine necessary action.	1.3
638	Inspect and replace wheel studs.	1.3
639	Remove and reinstall sealed wheel bearing assembly.	1.3

Certification to test for:
 (My Career Tech) Brakes



702	Identify and interpret electrical/electronic system concern; determine necessary action.	1.3
705	Use wiring diagrams during diagnosis of electrical circuit problems.	1.3
706	Check electrical circuits with a test light; determine necessary action.	1.3
707	Check electrical circuits using fused jumper wires; determine necessary action.	1.3
708	Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action.	1.3
712	Remove and replace terminal end from connector; replace connectors and terminal ends.	1.3
723	Perform starter current draw tests; determine necessary action.	1.3
724	Perform starter circuit voltage drop tests; determine necessary action.	1.3
726	Remove and install starter in a vehicle.	1.3
729	Perform charging system output test; determine necessary action.	1.3
730	Diagnose charging system for the cause of undercharge, no-charge, and overcharge conditions.	1.3
732	Remove, inspect, and install generator (alternator).	1.3
802	Identify and interpret engine performance concern; determine necessary action.	1.3
805	Identify components and inspect engine assembly for fuel, oil, coolant, and other leaks, determine necessary action.	1.3
806	Diagnose abnormal engine noise or vibration concerns; determine necessary action.	1.3
807	Diagnose abnormal exhaust color, odor, and sound; determine necessary action.	1.3
816	Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.	1.3
819	Perform active tests of actuators using a scan tool; determine necessary action.	1.3
820	Describe the importance of running all OBDII monitors for repair verification.	1.3
827	Replace fuel filters.	1.3
831	Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shield(s); perform necessary action.	1.3
833	Inspect, test and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action.	1.3
839	Inspect and test catalytic converter efficiency.	1.3

Certification to test for:
(ASE) Electrical



903	Install engine covers using gaskets, seals, and sealers as required.	1.3
1003	Check fluid level and fluid condition in a transmission or a transaxle not equipped with a dip-stick.	1.3
1005	Identify drivetrain components and configuration.	1.3
1008	Inspect, replace and/or align powertrain mounts.	1.3
1102	Drain and refill manual transmission/transaxle and final drive unit.	1.3
1103	Check and adjust clutch master cylinder fluid level.	1.3
1106	Drain and refill differential housing.	1.3
1107	Identify and inspect and/or replace manual drivetrain and axle components and configuration.	1.3
1203	Inspect A/C condenser for airflow restrictions.	1.3
1204	Inspect engine cooling and heater systems hoses.	1.3
1205	Inspect A/C-heater ducts, doors, hoses, cabin filters, and outlets.	1.3
813	Verify engine operating temperature; determine necessary action.	1.4
814	Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action.	1.4
822	Inspect and test ignition primary and secondary circuit wiring and solid state components; test ignition coil(s); perform necessary action.	1.4
837	Inspect and test mechanical components of secondary air injection systems; perform necessary action.	1.4
844	Remove and replace thermostat and gasket/seal.	1.4
845	Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action.	1.4
906	Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.	1.4
907	Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required.	1.4
1004	Drain and replace fluid and filter(s).	1.4
1007	Inspect for leakage at external seals, gaskets and bushings.	1.4
519	Inspect, and/or replace upper and lower control arms, bushings, shafts, and rebound bumpers.	2.1
520	Inspect, and/or replace strut rods and bushings.	2.1

**Certification to test for:
(ASE) Maintenance and
Light Repair**



521	Inspect, and/or replace upper and/or lower ball joints.	2.1
522	Inspect, and/or replace steering knuckle assemblies.	2.1
523	Inspect, and/or replace short and long arm suspension system coil springs and spring insulators.	2.1
524	Inspect, and/or replace, and adjust suspension system torsion bars; inspect mounts.	2.1
525	Inspect, and/or replace stabilizer bar bushings, brackets, and links.	2.1
526	Inspect, and/or replace strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount.	2.1
540	Diagnose tire pull problems; determine necessary action.	2.1
617	Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.	2.1
626	Remove and reinstall rotor.	2.1
709	Measure and diagnose the cause(s) of excessive parasitic draw; determine necessary action.	2.1
710	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.	2.1
711	Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; perform necessary action.	2.1
722	Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry following battery disconnect.	2.1
725	Inspect and test starter relays and solenoids; determine necessary action.	2.1
727	Inspect and test switches, connectors, and wires of starter control circuits; perform necessary action.	2.1
739	Diagnose the cause of incorrect operation of warning devices and other driver information systems.	2.1
740	Diagnose incorrect horn operation; perform necessary action.	2.1
746	Remove and reinstall door panel.	2.1
530	Perform pre-alignment inspection and measure vehicle ride height; perform necessary action.	2.2

Certification to test for:
 (ASE) Suspension and steering



531	Prepare vehicle for wheel alignment on the alignment machine; describe alignment angles and perform four wheel alignment by checking and adjusting front and rear wheel caster, camber; and toe as required; center steering wheel.	2.2
535	Check front and/or rear cradle (subframe) alignment; determine necessary action.	2.2
536	Inspect tire condition; identify tire wear patterns; check and adjust air pressure; determine necessary action.	2.2
539	Measure wheel, tire, axle flange, and hub runout; determine necessary action.	2.2
627	Refinish rotor on vehicle; measure final rotor thickness.	2.2
628	Refinish rotor off vehicle; measure final rotor thickness.	2.2
742	Diagnose incorrect washer operation; perform necessary action.	2.2
743	Diagnose incorrect operation of motor-driven accessory circuits; determine necessary action.	2.2
835	Inspect, test, service and replace components of the EGR system, including electrical/electronic sensors, controls, and wiring, EGR tubing, exhaust passages, vacuum/pressure controls, filters and hoses; perform necessary action.	2.2
838	Inspect and test electrical/electronically-operated components and circuits of air injection systems; perform necessary action.	2.2
841	Inspect and test components and hoses of the evaporative emissions control system; perform necessary action.	2.2
842	Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action.	2.2
1006	Inspect, adjust, and/or replace external manual valve shift linkage, transmission range sensor/switch, and/or park/neutral switch.	2.2
605	Measure brake pedal height, travel, and free play (as applicable); determine necessary action.	2.3
616	Refinish brake drum; measure final drum diameter.	2.3
625	Clean, inspect, and measure rotor thickness, lateral runout, and thickness variation; determine necessary action.	2.3
640	Identify and inspect electronic brake control system components; determine necessary action.	2.3
641	Diagnose electronic brake control system electronic control(s) and components by retrieving diagnostic trouble codes, and/or using recommended test equipment; determine necessary action.	2.3

Certification to test for:
SP/2 - Pollution
Prevention



643	Bleed the electronic brake control system hydraulic circuits.	2.3
644	Identify traction control/vehicle stability control system components.	2.3
713	Repair wiring harness and/or solder (including CAN/BUS systems) repair	2.3
728	Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition.	2.3
741	Diagnose incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action.	2.3
745	RESERVED	2.3
808	Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.	2.3
809	Perform cylinder power balance test; determine necessary action.	2.3
810	Perform cylinder cranking and running compression tests; determine necessary action.	2.3
811	Perform cylinder leakage test; determine necessary action.	2.3
826	Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume; perform necessary action.	2.3
830	Verify idle control operation.	2.3
843	Remove and replace timing belt; verify correct camshaft timing.	2.3
812	Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action.	2.4
817	Diagnose the causes of emissions or drivability concerns with stored or active diagnostic trouble codes; obtain, graph, and interpret scan tool data.	2.4
823	Inspect and test crankshaft and camshaft position sensor(s); perform necessary action.	2.4
824	Inspect, test, and/or replace ignition control module, powertrain/engine control module; reprogram as necessary.	2.4
825	Diagnose hot or cold no-starting, hard starting, poor drivability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems; determine necessary action.	2.4
828	Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air.	2.4
829	Inspect and test fuel injectors.	2.4
905	Adjust valves (mechanical or hydraulic lifters).	2.4

Certification test for:
 (ASE) Brakes

Certification test for:
 EPA 609 Refrigerant
 Recovery, Recycling
 Certification

Certification test for:
 OSHA



401	Prepare to obtain PA Safety Inspection Certification.	3.1	Certification test for: ASE Student Cert
402	Prepare to obtain EPA 609 Refrigerant Recovery, Recycling Certification.	3.1	
403	Prepare to obtain Emission Inspection Certification.	3.1	
MVCTC	Project Based Learning	3.2	Certification test for: PA Inspection/Emissions
MVCTC	Perform calculation of customer bill including labor, tax, parts and fees	3.3–3.4	
MVCTC	Cooperative Education	3.3–3.4	
MVCTC	Compile time card / work log	3.3–3.4	Certification test for: PA Inspection/Emissions
MVCTC	Prepare for post-secondary schooling / entry to industry: resume, interview skills, basic banking / credit, career planning, job search tips.	3.3–3.4	Certification test for: (S/P2) Interview Skills Certification test for: (S/P2) Building a Resume