

WARREN COUNTY SCHOOL DISTRICT
PLANNED INSTRUCTION

COURSE DESCRIPTION

Course Title: Automotive Technology

Course Number: 00902 AM 00952 PM

Course Prerequisites: Student must complete 9th grade before being accepted into the Automotive Technology Program.

Special Requirements: Mechanical talents, problem solving, and the ability to use “head and hands together” are very important. Applied math, science, computer, and communication skills are also vital to this career field.

Course Description:

47.0604

**AUTOMOBILE/AUTOMOTIVE MECHANICS TECHNOLOGY/TECHNICIAN
Pennsylvania CIP**

An instructional program that prepares individuals to apply technical knowledge and skills to engage in the servicing and maintenance of all types of automobiles and light trucks. This program includes instruction in the diagnosis and testing, including computer analysis, of malfunctions in and repair of engines, fuel, electrical, cooling and brake systems and drive train and suspensions. Instruction is also given in the adjustment and repair of individual components and systems such as cooling systems, drivetrains, fuel system components and air conditioning, and includes the use of technical repair information and the state inspection procedures.

Suggested Grade Level: **Grades 10-12**

Length of Course: _____ One Semester X Two Semesters _____ Other

Three periods per day (120 Min.) – Five Days per week – Three years

Units of Credit: 3 elective credits per year up to 9 credits

PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certification(s)

Vocational II—Automotive Mechanic

Certification verified by WCSD Human Resources Department:

 X Yes No

Board Approved Textbooks, Software, Materials:

Title: CDX Online eTextbook

Publisher: CDX Global

ISBN #: 9780763791117

Copyright Date: May, 2009
Date of Adoption: September 2008

BOARD APPROVAL:

Date Written: January 2009 – February 2010

Date Approved: April 12, 2010

Implementation Year: 2010-2011

Required Supplemental Materials: currently using:
Electronic Automotive Repair information system, Automotive online video training,
Automotive eTextbook, , , ASE end of program testing, SP-2 Online Safety Training.

Course Standards

PA Academic Standards:

Career Education and Work:

- 13.1.11D Justify the selection of a career.
(101-109)
- 13.2.11B Analyze and evaluate complex technical tasks using sophisticated processes.
(500-551, 601-652, 701-754, 801-853)
- 13.2.11D Identify sources of health, safety and regulatory practices and their effect on the work environment.
(101-109, 500-551, 601-652, 701-754, 801-853)
- 13.2.11F Analyze Performance-based assessments components.
(500-551, 601-652, 701-754, 801-853)
- 13.2.11G Analyze the need for manipulative/motor skills.
(100-109, 201-209, 601-652, 701-754, 801-853)
- 13.3.11A Analyze work habits needed to advance within a career.
(100-109, 201-209)

Science and Technology:

- 3.1.10A Discriminate among the concepts of systems, subsystems, feedback and control in solving technological problems.
(101-109, 210-209, 500-551, 701-754, 801-853)
- 3.1.10E Describe patterns of change in nature, physical and man made systems.
(500-551, 601-651, 701-754, 801-853)
- 3.7.10A Identify and safely use a variety of tools, basic machines, materials and techniques to solve problems and answer questions.
(500-551, 601-651, 701-754, 801-853)
- 3.7.10B Apply appropriate instruments and apparatus to examine a variety of objects and processes.
(500-551, 601-651, 701-754, 801-853)
- 3.7.10 D Utilize computer software to solve specific problems.
(500-551, 601-651, 701-754, 801-853)
- 3.7.12A Apply advanced tools, materials and techniques to answer complex questions.

- 3.7.12B Evaluate appropriate instruments and apparatus to accurately measure materials and processes.
(500-551, 601-651, 701-754, 801-853)

Math:

- 2.3.11A Select and use appropriate units and tools to measure to the degree of accuracy required in particular measurement situations.
(101-109, 501-551, 601-651, 701-754, 801-853)
- 2.3.11C Demonstrate the ability to produce measures with specified levels of precision.
(500-551, 501-561, 601-651, 701-754, 801-859)
- 2.5.11C Present mathematical procedures and results clearly, systematically, succinctly and correctly.
(201-210, 500-551, 601-651, 701-754, 801-853)

Reading, Writing, Speaking, and Listening:

- 1.1.11A Locate various texts, media and traditional resources for assigned and independent projects before reading.
(201-210, 500-551, 601-651, 701-754, 801-853)
- 1.2.11A Read and understand essential content of informational texts and documents in all academic areas.
(201-210, 500-551, 601-651, 701-754, 801-853)
- 1.4.1D Maintain a written record of activities, course work, experience, honors and interests.
(100-109, 500-551, 601-651, 701-754, 801-853)
- 1.4.1E Write a personal resume.
(100-109)
- 1.6.11A Listen to others.
(101-109, 201-210, 500-551, 601-651, 701-754, 801-853)

WCSD Academic Standards:

Aligned with PA Standards

Industry or Other Standards:

1. **Automotive Technology NOCTI Written Exam**
2. **Automotive Technology NOCTI Performance Exam**
3. **AYES Certificate** Certification of a candidate's automotive technology skills based on An internship and exit exam. <http://www.aves.org/>
4. **AAA Ford Trouble Shooting Written Exam** <http://www.autoskills.com>
5. **AAA Ford Trouble Shooting Performance Exam** <http://www.autoskills.com>
6. **Section 609 Certification for Refrigerant Recycling and Recovery** Section 609 of the Clean Air Act requires that all technicians who open the refrigeration circuit in automotive air conditioning systems be certified.
<http://www.macsw.org/AM/Template.cfm?Section=Section609>
7. **Automotive Service Excellence (ASE)** Certification for automotive repair technicians.
<http://www.natef.org/about/aboutasenatf.cfm>
8. **Certified Emissions Inspector Certified Emissions Inspector Training;**

PennDOT-approved certification course.

<http://www.drivecleanpa.state.pa.us/drivecleanpa/info service.htm>

9. **Certified Safety Inspector** Candidates must complete a PennDOT-approved Safety course and complete the required exams.

<http://www.dot4.state.pa.us/inspections/safety stationmech faq.shtml>

10. **S/P2 Safety & Pollution Prevention** <http://www.ccar-traininglink.org/index.ph>

SPECIAL EDUCATION AND GIFTED REQUIREMENTS

The teacher shall make appropriate modifications to instruction and assessment based on a student's Individual Education Plan (IEP) or Gifted Individual Education Plan (GIEP).

**SPECIFIC EDUCATIONAL OBJECTIVES/CORRESPONDING STANDARDS AND
ELIGIBLE CONTENT WHERE APPLICABLE**

(List Objectives, PA Standards #'s, Other Standards (see samples at end))

*All of the following standards are meant by the use of CDX Global online and Alldata
information system online..*

All assignments and curriculum are online for student access at home or at school.

**Automobile/Automotive Mechanics Technology/Technician
CIP 47.0604**

PA Academic Standards/Eligible Content Alignment Task List

100 ORIENTATION

- 101 Explain and follow all lab rules
- 102 Participate in basic shop management
- 104 Explain career opportunities
- 105 Demonstrate auto shop safety and hygiene
- 107 Demonstrate proper telephone courtesy
- 108 Identify vehicle by: sight, V.I.N. and/or ID tag

200 SAFETY

- 201 Identify and follow all safety rules
- 202 Demonstrate the ability to secure vehicles on jack stands and hydraulic lifts
- 203 Demonstrate the ability to safely set-up/shut-down oxygen acetylene welding equipment
- 204 Identify chemical safety, Right-To-Know Laws and Materials Safety Data Sheets (MSDS)
- 205 Identify and demonstrate the safe use of hand tools
- 206 Identify and demonstrate the safe use of power tools
- 207 Identify and demonstrate the safe use of protective clothing and equipment
- 208 Identify and demonstrate the safe use of fire protection equipment
- 209 Identify and demonstrate the safe use of shop equipment
- 210 Explain EPA and OSHA regulations

300 TOOLS/FASTENERS

- 301 Identify and use fasteners and bolts
- 302 Demonstrate the ability to correctly drill and use re-threading tools
- 303 Demonstrate the ability to correctly read and interpret automotive measuring tools

400 CERTIFICATIONS

- 401 Obtain PA Safety Inspection Certification
- 402 Obtain EPA 609 Refrigerant Recovery, Recycling Certification

500 SUSPENSION AND STEERING

- 501 Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction
- 502 Identify and interpret suspension and steering system concerns; determine necessary action
- 503 Research applicable vehicle and service information, such as suspension and steering system operation, vehicle service history, service precautions, and technical service bulletins
- 504 Locate and interpret vehicle and major component identification numbers
- 505 Disable and enable supplemental restraint system (SRS)
- 506 Remove and replace steering wheel; center/time supplemental restraint system (SRS) coil (clock spring)
- 507 Inspect steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action
- 508 Adjust non-rack and pinion worm bearing preload and sector lash
- 509 Remove and replace rack and pinion steering gear; inspect mounting bushings and brackets
- 510 Inspect and replace rack and pinion steering gear inner tie rod ends (sockets) and bellows boots
- 511 Determine proper power steering fluid type; inspect fluid level and condition
- 512 Flush, fill, and bleed power steering system
- 513 Diagnose power steering fluid leakage; determine necessary action
- 514 Remove, inspect, replace, and adjust power steering pump belt
- 515 Remove and reinstall power steering pump
- 516 Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment
- 517 Inspect and replace hoses and fittings
- 518 Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper
- 519 Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps
- 520 Inspect and test electric power assist steering

- 521 Diagnose short and long arm suspension system noises, body sway, and uneven ride height concerns; determine necessary action
- 522 Diagnose strut suspension system noises, body sway, and uneven ride height concerns; determine necessary action
- 523 Remove, inspect, and install upper and lower control arms, bushings, shafts, and rebound bumpers
- 524 Remove, inspect and install strut rods and bushings
- 525 Remove, inspect, and install upper and/or lower ball joints
- 526 Remove, inspect, and install steering knuckle assemblies
- 527 Remove, inspect, and install short and long arm suspension system coil springs and spring insulators
- 528 Remove, inspect, install, and adjust suspension system torsion bars; inspect mounts
- 529 Remove, inspect, and install stabilizer bar bushings, brackets, and links
- 530 Remove, inspect, and install strut cartridge or assembly, strut coil spring, insulators (silencers), and upper
- 531 Inspect, remove, and replace shock absorbers
- 532 Remove, inspect, and service or replace front and rear wheel bearings
- 533 Describe the function of the idle speed compensation switch
- 534 Lubricate suspension and steering systems
- 535 Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine necessary action
- 536 Perform pre-alignment inspection and measure vehicle ride height; perform necessary action
- 537 Prepare vehicle for wheel alignment on the alignment machine; perform four wheel alignment by checking and adjusting front and rear wheel caster, camber; and toe as required; center steering wheel
- 538 Check SAI (steering axis inclination) and included angle; determine necessary action
- 539 Check rear wheel thrust angle; determine necessary action
- 540 Check for front wheel setback; determine necessary action
- 541 Check front and/or rear cradle (subframe) alignment; determine necessary action
- 542 Inspect tire condition; identify tire wear patterns; check and adjust air pressure; determine necessary action
- 543 Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action
- 544 Rotate tires according to manufacturers recommendations
- 545 Measure wheel, tire, axle flange, and hub runout; determine necessary action
- 546 Diagnose tire pull problems; determine necessary action
- 547 Dismount, inspect, and remount tire on wheel; Balance wheel and tire assembly (static and dynamic)
- 548 Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor
- 549 Reinstall wheel; torque lug nuts
- 550 Inspect tire and wheel assembly for air loss; perform necessary action
- 551 Repair tire using internal patch
- 600 BRAKES**
- 601 Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction
- 602 Identify and interpret brake system concern; determine necessary action
- 603 Research applicable vehicle and service information, such as brake system operation, vehicle service history, service precautions, and technical service bulletins
- 604 Locate and interpret vehicle and major component identification numbers
- 605 Diagnose pressure concerns in the brake system using hydraulic principles (Pascals Law)
- 606 Measure brake pedal height, travel, and free play (as applicable); determine necessary action
- 607 Check master cylinder for internal/external leaks and proper operation; determine necessary action
- 608 Remove, bench bleed, and reinstall master cylinder
- 609 Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action
- 610 Replace brake lines, hoses, fittings, and supports
- 611 Fabricate brake lines using proper material and flaring procedures (double flare and ISO types)
- 612 Select, handle, store, and fill brake fluids to proper level
- 613 Inspect, test, and/or replace components of brake warning light system
- 614 Bleed and/or flush brake system
- 615 Test brake fluid for contamination
- 616 Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action
- 617 Remove, clean, inspect, and measure brake drums; determine necessary action
- 618 Refinish brake drum; measure final drum diameter
- 619 Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble
- 620 Inspect and install wheel cylinders
- 621 Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings
- 622 Install wheel, torque lug nuts, and make final checks and adjustments.
- 623 Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pulsation concerns; determine necessary action.
- 624 Remove caliper assembly; inspect for leaks and damage to caliper housing; determine necessary action.

- 625 Clean and inspect caliper mounting and slides/pins for operation, wear, and damage; determine necessary action
- 626 Remove, inspect and replace pads and retaining hardware; determine necessary action
- 627 Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring, and damage; replace seal, boot, and damaged or worn parts
- 628 Reassemble, lubricate, and reinstall caliper, pads, and related hardware; seat pads, and inspect for leaks
- 629 Clean, inspect, and measure rotor thickness, lateral runout, and thickness variation; determine necessary action
- 630 Remove and reinstall rotor
- 631 Refinish rotor on vehicle; measure final rotor thickness
- 632 Refinish rotor off vehicle; measure final rotor thickness
- 633 Install wheel, torque lug nuts, and make final checks and adjustments
- 634 Check brake pad wear indicator system operation; determine necessary action
- 635 Test pedal free travel; check power assist operation
- 636 Check vacuum supply to vacuum-type power booster
- 637 Inspect the vacuum-type power booster unit for leaks; inspect the check valve for proper operation; determine necessary action
- 638 Diagnose wheel bearing noises, wheel shimmy, and vibration concerns; determine necessary action
- 639 Remove, clean, inspect, repack, and install wheel bearings and replace seals; install hub and adjust bearings
- 640 Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed
- 641 Check parking brake and indicator light system operation; determine necessary action
- 642 Check operation of brake stop light system; determine necessary action
- 643 Replace wheel bearing and race
- 644 Inspect and replace wheel studs
- 645 Remove and reinstall sealed wheel bearing assembly
- 646 Identify and inspect electronic brake control system components; determine necessary action
- 647 Diagnose electronic brake control system electronic control(s) and components by retrieving diagnostic trouble codes, and/or using recommended test equipment; determine necessary action
- 648 Depressurize high-pressure components of the electronic brake control system
- 649 Bleed the electronic brake control system hydraulic circuits
- 650 Remove and install electronic brake control system electrical/electronic and hydraulic components
- 651 Test, diagnose, and service electronic brake control system speed sensors (digital and analog), toothed ring (tone wheel), and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to ground)
- 652 Identify traction control/vehicle stability control system components
- 700 ELECTRICAL/ELECTRONIC SYSTEMS**
- 701 Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction
- 702 Identify and interpret electrical/electronic system concern; determine necessary action
- 703 Research applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins
- 704 Locate and interpret vehicle and major component identification numbers
- 705 Diagnose electrical/electronic integrity of series, parallel and series-parallel circuits using principles of electricity (Ohms Law)
- 706 Use wiring diagrams during diagnosis of electrical circuit problems
- 707 Demonstrate the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems, including: source voltage, voltage drop, current flow, and resistance
- 708 Check electrical circuits with a test light; determine necessary action
- 709 Check electrical circuits using fused jumper wires; determine necessary action
- 710 Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action
- 711 Measure and diagnose the cause(s) of excessive parasitic draw; determine necessary action
- 712 Inspect and test fusible links, circuit breakers, and fuses; determine necessary action
- 713 Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; perform necessary action
- 714 Remove and replace terminal end from connector; replace connectors and terminal ends
- 715 Repair wiring harness (including CAN/BUS systems).
- 716 Perform solder repair of electrical wiring
- 717 Identify location of hybrid vehicle high voltage circuit disconnect (service plug) location and safety procedures
- 718 Perform battery state-of-charge test; determine necessary action
- 719 Perform battery capacity test; confirm proper battery capacity for vehicle application; determine necessary action
- 720 Maintain or restore electronic memory functions

- 721 Inspect, clean, fill, and/or replace battery, battery cables, connectors, clamps, and hold-downs
- 722 Perform battery charge
- 723 Start a vehicle using jumper cables or an auxiliary power supply
- 724 Identify high voltage circuits of electric or hybrid electric vehicle and related safety precautions
- 725 Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry following battery disconnect
- 726 Identify hybrid vehicle auxiliary (12v) battery service, repair and test procedures
- 727 Perform starter current draw tests; determine necessary action
- 728 Perform starter circuit voltage drop tests; determine necessary action
- 729 Inspect and test starter relays and solenoids; determine necessary action
- 730 Remove and install starter in a vehicle
- 731 Inspect and test switches, connectors, and wires of starter control circuits; perform necessary action
- 732 Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition
- 733 Perform charging system output test; determine necessary action
- 734 Diagnose charging system for the cause of undercharge, no-charge, and overcharge conditions
- 735 Inspect, adjust, or replace generator (alternator) drive belts, pulleys, and tensioners; check pulley and belt alignment
- 736 Remove, inspect, and install generator (alternator)
- 737 Perform charging circuit voltage drop tests; determine necessary action
- 738 Diagnose the cause of brighter than normal, intermittent, dim, or no light operation; determine necessary action
- 739 Inspect, replace, and aim headlights and bulbs
- 740 Inspect and diagnose incorrect turn signal or hazard light operation; perform necessary action
- 741 Identify system voltage and safety precautions associated with high intensity discharge headlights
- 742 Inspect and test gauges and gauge sending units for cause of abnormal gauge readings; determine necessary action
- 743 Inspect and test connectors, wires, and printed circuit boards of gauge circuits; determine necessary action
- 744 Diagnose the cause of incorrect operation of warning devices and other driver information systems; determine necessary action
- 745 Inspect and test sensors, connectors, and wires of electronic (digital) instrument circuits; determine necessary action
- 746 Diagnose incorrect horn operation; perform necessary action
- 747 Diagnose incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action
- 748 Diagnose incorrect washer operation; perform necessary action
- 749 Diagnose incorrect operation of motor-driven accessory circuits; determine necessary action
- 750 Diagnose incorrect electric lock operation (including remote keyless entry); determine necessary action
- 751 Diagnose supplemental restraint system (SRS) concerns; determine necessary action
- 752 Disarm and enable the airbag system for vehicle service
- 753 Remove and reinstall door panel
- 754 Describe the operation of keyless entry/remote-start systems

800 ENGINE PERFORMANCE

- 801 Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction
- 802 Identify and interpret engine performance concern; determine necessary action
- 803 Research applicable vehicle and service information, such as engine management system operation, vehicle service history, service precautions, and technical service bulletins
- 804 Locate and interpret vehicle and major component identification numbers
- 805 Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action
- 806 Diagnose abnormal engine noise or vibration concerns; determine necessary action
- 807 Diagnose abnormal exhaust color, odor, and sound; determine necessary action
- 808 Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action
- 809 Perform cylinder power balance test; determine necessary action
- 810 Perform cylinder cranking and running compression tests; determine necessary action
- 811 Perform cylinder leakage test; determine necessary action
- 812 Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action
- 813 Verify engine operating temperature; determine necessary action
- 814 Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses; perform necessary action
- 815 Verify correct camshaft timing
- 816 Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable
- 817 Diagnose the causes of emissions or driveability concerns with stored or active diagnostic trouble codes; obtain, graph, and interpret scan tool data

- 818 Diagnose emissions or driveability concerns without stored diagnostic trouble codes; determine necessary action
- 819 Inspect and test computerized engine control system sensors, powertrain/engine control module (PCM/ECM), actuators, and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO); perform necessary action
- 820 Access and use service information to perform step-by-step diagnosis
- 821 Perform active tests of actuators using a scan tool; determine necessary action
- 822 Describe the importance of running all OBDII monitors for repair verification
- 823 Diagnose ignition system related problems such as no-starting, hard starting, engine misfire, poor driveability, spark knock, power loss, poor mileage, and emissions concerns; determine necessary action
- 824 Inspect and test ignition primary and secondary circuit wiring and solid state components; test ignition coil(s); perform necessary action
- 825 Inspect and test crankshaft and camshaft position sensor(s); perform necessary action
- 826 Inspect, test, and/or replace ignition control module, powertrain/engine control module; reprogram as necessary
- 827 Diagnose hot or cold no-starting, hard starting, poor driveability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems; determine necessary action
- 828 Check fuel for contaminants and quality; determine necessary action
- 829 Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume; perform necessary action
- 830 Replace fuel filters
- 831 Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmetered air
- 832 Inspect and test fuel injectors
- 833 Verify idle control operation
- 834 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
- 835 Perform exhaust system back-pressure test; determine necessary action
- 836 Diagnose oil leaks, emissions, and driveability concerns caused by the positive crankcase ventilation (PCV) system; determine necessary action
- 837 Inspect, test and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action
- 838 Diagnose emissions and driveability concerns caused by the exhaust gas recirculation (EGR) system; determine necessary action
- 839 Inspect, test, service and replace components of the EGR system, including EGR tubing, exhaust passages, vacuum/pressure controls, filters and hoses; perform necessary action
- 840 Inspect and test electrical/electronic sensors, controls, and wiring of exhaust gas recirculation (EGR) systems; perform necessary action
- 841 Inspect and test mechanical components of secondary air injection systems; perform necessary action
- 842 Inspect and test electrical/electronically-operated components and circuits of air injection systems; perform necessary action
- 843 Inspect and test catalytic converter efficiency
- 844 Diagnose emissions and driveability concerns caused by the evaporative emissions control system; determine necessary action
- 845 Inspect and test components and hoses of the evaporative emissions control system; perform necessary action
- 846 Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action
- 847 Adjust valves on engines with mechanical or hydraulic lifters
- 848 Remove and replace timing belt; verify correct camshaft timing
- 849 Remove and replace thermostat and gasket/seal
- 850 Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action
- 851 Perform common fastener and thread repairs, to include: remove broken bolt, restore internal and external threads, and repair internal threads with a threaded insert
- 852 Perform engine oil and filter change
- 853 Identify hybrid vehicle internal combustion engine service precautions

ASSESSMENTS

PSSA Assessment Anchors Addressed: The teacher must be knowledgeable of the PDE Assessment Anchors and/or Eligible Content and incorporate them into this planned instruction. Current assessment anchors can be found at pde@state.pa.us.

Formative Assessments: The teacher will develop and use standards-based assessments throughout the course.

Portfolio Assessment: Yes No

District-wide Final Examination Required: Yes No

Course Challenge Assessment (Describe):

- 1. Instructor approved Portfolio**
- 2. Automotive Technology NOCTI Written Exam**
- 3. Automotive Technology NOCTI Performance Exam**
- 4. AYES Certificate** Certification of a candidate's automotive technology skills based on An internship and exit exam. <http://www.aves.org/>
- 5. AAA Ford Trouble Shooting Written Exam** <http://www.autoskills.com>
- 6. AAA Ford Trouble Shooting Performance Exam** <http://www.autoskills.com>
- 7. Section 609 Certification for Refrigerant Recycling and Recovery** Section 609 of the Clean Air Act requires that all technicians who open the refrigeration circuit in automotive air conditioning systems be certified.
<http://www.macsw.org/AM/Template.cfm?Section=Section609>
- 8. Automotive Service Excellence (ASE)** Certification for automotive repair technicians.
<http://www.natef.org/about/aboutasenatef.cfm>
- 9. Certified Emissions Inspector Certified** Certified Emissions Inspector Training; PennDOT-approved certification course.
http://www.drivecleanpa.state.pa.us/drivecleanpa/info_service.htm
- 10. Certified Safety Inspector** Candidates must complete a PennDOT-approved Safety course and complete the required exams.
http://www.dot4.state.pa.us/inspections/safety_stationmech_faq.shtml
- 11. S/P2 Safety & Pollution Prevention** <http://www.ccar-traininglink.org/index.php>

WRITING TEAM:

Ron Scalise, Owner
Ram's Engine
110 south Irvine
Warren, PA 16365

Mike Sherrard, Owner
Allegheny Transmission Service
700 Penna. Ave. East
Warren, PA 16365

Mr. Charles Scott, Owner
Auto Whisperer
1035 Market St.
Warren, Pa. 16365

Mr. Steve Lucas, Manager
Barnhart Davis Co.
1201 Penna. Ave. East
Warren, Pa. 16365

Mr. Mark Lytle, Owner
Lytle's Car Clinic
37 Euclid Ave.
Warren, Pa. 16365

Mr. Randy Fredericks, Master Technician
Midtown Motors
1089 Market St. Ext.
Warren, Pa. 16365

Mr. Melvin Jacobson, Manager
Midtown Motors
1089 Market St. Ext.
Warren, Pa. 16365

Bill Chase, Owner
Chase Car Care
Sugar Grove, Pa. 16350

Craig Williams, Master Technician
Ed Shults
1658 North Market St.
Warren, Pa. 16365

WCSD STUDENT DATA SYSTEM INFORMATION

- | | | |
|---|---|--|
| 1. Is there a required final examination? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 2. Does this course issue a mark/grade for the report card? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 3. Does this course issue a Pass/Fail mark? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| 4. Is the course mark/grade part of the GPA calculation? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 5. Is the course eligible for Honor Roll calculation? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 6. What is the academic weight of the course? | | |
| _____ No weight/Non credit | <input checked="" type="checkbox"/> | Standard weight |
| _____ Enhanced weight (Describe) | | |