AUTOMOTIVE ENGINE PERFORMANCE ADVANCED (III)
Course Syllabus

Course Number:	EP103	**Instructor:**	Ron Rader
OCAS Code:		**Phone Number:**	580-327-0344
Course Length:	105 hours	**Email:**	rrader@nwtech.edu
Career Cluster:	Transportation	**Campus:**	Alva, OK
Career Pathway:	Automotive Service	**Program:**	Automotive Service Technology
Career Major:	Automotive Service Technician, Automotive Drivability Technician		
Pre-requisite:	Automotive Introduction, Automotive Engine Performance Introduction, Automotive Engine Performance Fundamentals		

Course Description: In this course the student will learn to perform diagnosis using a gas analyzer, oscilloscope and engine diagnostic equipment. Students will learn to diagnose the cause of emissions or drivability resulting from failure of computerized engine controls, power control module (PCM) and interrelated systems. This course also covers diagnose and repair action for hot and cold no-start situations, engine misfire, stalling, poor mileage, flooding and hesitation on vehicles with injection type fuel systems. Students will learn to inspect, test and clean fuel injectors as well as test the operation of turbochargers and superchargers and determine necessary action. Students will cover drivability problems resulting from exhaust gas recirculation (EGR) failure, secondary air injection and catalytic converter systems as well as failure of the intake air temperature control system, and the failure of the evaporative control system. Student will learn to check for module communication errors using a scan tool on CAN/BUS systems.

Instructional Philosophy: To provide a training program that is of merit both educationally and ethically while effectively providing the individual learner the opportunities, knowledge and skills necessary to succeed in the workplace as well as life.

Course Goals: Upon successful completion of this course, the student will be able to:

Competencies:
General Engine Diagnosis
Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns with oscilloscope and engine diagnostic equipment; determine necessary action.
Prepare 4 or 5 gas analyzer; inspect and prepare vehicle for test, and obtain exhaust readings; interpret readings, and determine necessary action.
Computerized Engine Controls Diagnosis and Repair
Diagnose the causes of emissions or drivability concerns resulting from failure of computerized engine controls with stored diagnostic trouble codes.
Diagnose emissions or drivability concerns resulting from failure of computerized engine controls with no stored diagnostic trouble codes; determine necessary action.
Inspect and test computerized engine control system sensors, powertrain control module (PCM), actuators, and circuits; perform necessary action.
Diagnose drivability and emissions problems resulting from failures of interrelated systems (cruise control, security alarms, suspension controls, traction controls, A/C, automatic transmissions, non-OEM-installed accessories, and similar systems); determine necessary action.
Fuel, Air Induction, and Exhaust Systems Diagnosis and Repair

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 on vehicles with carburetor-type fuel systems; determine necessary action.

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 on vehicles with injection-type fuel systems; determine necessary action.

Check fuel for contaminants and quality; determine necessary action.

Inspect, test, and clean fuel injectors.

Test the operation of turbocharger/supercharger systems; determine necessary actionP-3

Emissions Control Systems Diagnosis and Repair

Exhaust Gas Recirculation

Diagnose emissions and drivability problems caused by failure of the exhaust gas recirculation (EGR) system; determine necessary action.

Exhaust Gas Treatment

Diagnose emissions and drivability problems resulting from failure of the secondary air injection and catalytic converter systems; determine necessary action.

Intake Air Temperature Controls

Diagnose emissions and drivability problems resulting from failure of the intake air temperature control system; determine necessary action.

Early Fuel Evaporation (Intake Manifold Temperature) Controls

Diagnose emissions and drivability problems resulting from failure of early fuel evaporation control system; determine necessary action.

Evaporative Emissions Controls

Diagnose emissions and drivability problems resulting from failure of evaporative emissions control system; determine necessary action.

Major Course Projects:	Students will perform tasks relating to the Automotive Service Industry as per standards identified by the National Automotive Technicians Education Foundation (NATEF). Students will complete repair orders each day and will document completion of competencies on competency profiles tracking individual progress and accomplishment.
Project Outline:	Projects will include performing tasks on mock ups, shop vehicles, and live work as student skills progress. These projects will reinforce classroom theory instruction and will require the student to consult industry service information during the course of task performance.
Instructional Delivery Plan:	The instruction for this course will be comprised of multiple methods designed to promote and accommodate different learning styles including classroom lecture, classroom demonstrations, shop demonstrations, hands on learning activities, classroom discussion, interactive media, textbook, computer based learning activities, research projects, guest speakers, student presentations, and interactive learning with CPS (Classroom Performance System). Students will be required to practice the skills associated with the instructional content and will be required to work independently and also in teams. Assignments will require students to use academic skills in math, science, and language arts.
Assessment Plan:	Students will be assessed according to three basic kinds of learning. Knowledge: Does the student possess the required knowledge to perform a specific competency? Skills: Does the student possess the necessary coordination to perform the task/competency?

Attitude: Will the student perform the task/competency on the job after learning to do it? Students will also be assessed according to the basic work skills of attendance and promptness. Soft skills will be assessed in the Academic Career Center.

      50%   Daily work- Performance of technical skills on job, work habits, safety, clean-up, participation

      50%   Written assignment- Repair orders, textbook assignments, etc.

Grading Scale:

A 90-100   Exceeds expectations
B 80-89   Meets industry standards and expectations
C 70-79   Passing grade, but does not meet some standards
D 60-69   Passing, but only meets the minimum standards
F Below 60 Failing, does not meet minimum standards

Alliance Credit Offered:	OSU Okmulgee
Industry Alignments:	ASE Certification, ODCTE Certification,
End of Instruction Industry Assessment:	ASE Certification, ODCTE Certification,
Resources:	Automotive Excellence Vol. 1 and Vol. 2 Modern Automotive Technology Introduction to Automotive Service: Fundamental Concepts CDX Global Interactive Training Snap On Shop Key Alldata
Attachments:	See Automotive Service Technology Task List Competency Handbook