JEFFERSON COLLEGE

COURSE SYLLABUS

AUT162

INTRODUCTION TO ENGINE PERFORMANCE LAB

3 Credit Hours

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AUT162 Introduction to Engine Performance Lab

I. CATALOGUE DESCRIPTION

A. Pre-requisites: AUT141 Automotive Steering and Suspension Systems with a grade of "C" or better
AUT142 Automotive Steering and Suspension Systems Lab grade of "C" or better
AUT151 Automotive Engine Repair with a grade of "C" or
AUT152 Automotive Engine Repair Lab with a grade of "C" or better
Reading Proficiency
Co-requisite: AUT161 Introduction to Engine Performance

B. 3 Semester Credit Hours

C. Introduction to Engine Performance Lab is the hands-on study of various engine components and subsystems and how these affect engine performance. The emphasis is on the diagnosis and repair of engine components and subsystems. The course will focus on live shop experiences and on car repairs. Completion of this course will help the student prepare for entry level employment and passing the National Institute for Automotive Service Excellence (ASE) Engine Repair Test (A1) and the Engine Performance Test (A8). (S, SU)

II. EXPECTED LEARNING OUTCOMES/ASSESSMENT MEASURES

A. Diagnosis of Exhaust		
Demonstrate the knowledge of identifying and interpreting engine performance concerns; determine necessary action	P-1	Identify and interpret engine performance concern; Determine Necessary Action
Demonstrate the knowledge of researching applicable vehicle and service information, such as engine management system operation, vehicle service history, service precautions, and technical service bulletins	P-1	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins
Demonstrate the knowledge of diagnosing abnormal engine noise or vibration concerns; determine necessary action	P-3	Diagnose abnormal engine noise or vibration concerns; Determine Necessary Action
Demonstrate the knowledge of diagnosing excessive oil consumption, coolant consumption unusual exhaust color, odor, and sound; determine necessary	P-2	Diagnose the cause of excessive oil consumption, coolant consumption, unusual exhaust color, odor, and sound; Determine Necessary Action

B. Cylinder Pressure Tests		
Demonstrate the knowledge of performing cylinder cranking and running compression tests; determine necessary action	P-1	Perform cylinder cranking and running compression tests; Determine Necessary Action
Demonstrate the knowledge of performing cylinder leakage test; determine necessary action	P-1	Perform cylinder leakage test; Determine Necessary Action
Demonstrate the knowledge of performing engine absolute (vacuum/boost) manifold pressure tests; determine necessary action	P-1	Perform engine absolute (vacuum/boost) manifold pressure tests: Determine Necessary Action

C. Cooling System Operation and Testing		
Demonstrate the knowledge of performing cooling system pressure and dye tests to identify leaks; check coolant condition and level inspect and test radiator, pressure cap, coolant recovery tank, and heater core and galley plugs; hoses; determine necessary action	P-1	Performing cooling system pressure and dye tests to identify leaks; check coolant condition and level inspect and test radiator, pressure cap, coolant recovery tank, and heater core and galley plugs; hoses; Determine Necessary Action
Demonstrate the knowledge of verifying engine operating temperature; determine necessary action	P-1	Verify engine operating temperature; Determine Necessary Action
Demonstrate the knowledge of identifying the causes of engine overheating	P-1	Identify the causes of engine overheating
Demonstrate the knowledge of inspecting and testing coolant; draining and recovering coolant; flushing and refilling cooling system with recommended coolant; bleeding air as required	P-1	Inspect and test coolant; ; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required
Demonstrate the knowledge of removing and replacing radiator	P-2	Remove and replace radiator
Demonstrate the knowledge of removing and replacing thermostat and gasket/seal	P-1	Remove and replace thermostat and gasket/seal
Demonstrate the knowledge of inspecting and testing fan(s) (electrical or mechanical), fan clutch, fan shroud/ducting, air dams	P-1	Inspect and test fan(s) (electrical or mechanical), fan clutch, fan shroud/ducting, air dams

D. Lubrication System		
Demonstrate the knowledge of performing oil pressure tests	P-2	Perform oil pressure test
Demonstrate the knowledge of performing engine oil and filter change	P-1	Perform oil and filter change
Demonstrate the knowledge of inspecting auxiliary coolers; determine necessary action	P-3	Inspect auxiliary coolers; Determine Necessary Action
Demonstrate the knowledge of inspecting, testing, and replacing oil temperature and pressure switches and sensors	P-2	Inspect, test, and replace oil temperature and pressure switches and sensors

E. PCV System		
Demonstrate the knowledge of inspecting, testing and servicing positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action	P-2	Inspect, test and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; Perform Necessary Action
Demonstrate the knowledge of diagnosing oil leaks, emissions, and driveability concerns caused by the positive crankcase ventilation system; determine necessary action	P-3	Diagnose oil leaks, emissions, and driveability concerns caused by the positive crankcase ventilation system; Determine Necessary Action
Demonstrate the knowledge of inspecting the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tailpipe(s), heat shield(s); perform necessary action	P-2	Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tailpipe(s), heat shield(s); Perform Necessary Action

F. Air Induction, and Exhaust system Diagnosis and Repair		
Demonstrate the knowledge of inspecting, servicing, or replacing air filters, filter housings, and intake duct work.	P-1	Inspect, service or replace air filters, filter housings, and intake duct work
Demonstrate the knowledge of inspecting the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tailpipe(s), heat shield(s); perform necessary actions	P-1	Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tailpipe(s), heat shield(s); Perform Necessary Actions

III. OUTLINE OF TOPICS

A. Intake and Exhaust Systems
   1. Perform visual inspection of an exhaust system
   2. Determine cause of abnormal conditions
   3. Determine corrective action
   4. Perform inspection of intake system ductwork and filters

B. Compression Testing
   1. Prepare an engine for compression testing
   2. Perform a compression (dry, wet and running) test using a mechanical gauge
   3. Interpret test results and determine appropriate action

C. Cylinder Leakage Testing
   1. Prepare an engine for a cylinder leakage test
   2. Perform a cylinder leakage test on the engine
   3. Interpret test results
   4. Determine appropriate action

D. Cooling System Operation and Testing
   1. Test condition of engine coolant (freezepoint and acidity level)
   2. Perform visual inspection of the cooling system
   3. Perform a cooling system pressure test and test fans for proper operation
   4. Interpret test results and determine appropriate action
   5. Replace cooling system components (radiator, thermostat, etc)

E. Lubrication System Testing and Service
   1. Perform oil and filter change
   2. Inspect auxiliary coolers
   3. Perform lubrication system pressure tests and determine appropriate Action
   4. Inspect, test and replace oil pressure switches

F. PCV System
   1. Perform a visual inspection of the PCV system
   2. Test PCV system
   3. Determine appropriate action

IV. METHOD(S) OF INSTRUCTION

A. Lab Exercises

B. Live Work on Cars

C. Group Activities

V. REQUIRED TEXTBOOK(S)

Halderman, James, *Automotive Engines, Theory and Servicing NATEF Correlated Task Sheets* (Current Edition), Pearson

VI. REQUIRED MATERIALS

A. Jefferson College Automotive Technology Shirts (2)

B. Safety Glasses (Clear)

C. Shop Boots (Steel Toe Preferred)

VII. SUPPLEMENTAL REFERENCES

None

VIII. METHODS OF EVALUATION

A.	Lab Sheets (NATEF Competencies)	50%
B.	Technician Supplemental Tasks	50%

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Technology Center 101; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College Website http://www.jeffco.edu).

XI. ATTENDANCE STATEMENT

Regular and punctual attendance is expected of all students. Any one of these four options may result in the student being removed from the class and an administrative withdrawal being processed: (1) Student fails to begin class; (2) Student ceases participation for at least two consecutive weeks; (3) Student misses 15 percent or more of the coursework; and/or (4) Student misses 15 percent or more of the course as defined by the instructor. Students earn their financial aid by regularly attending and actively participating in their coursework. If a student does not actively participate, he/she may have to return financial aid funds. Consult the College Catalog or a Student Financial Services representative for more details.

XII. OUTSIDE OF CLASS ACADEMICALLY RELATED ACTIVITIES

The U.S. Department of Education mandates that students be made aware of expectations regarding coursework to be completed outside the classroom. Students are expected to spend substantial time outside of class meetings engaging in academically related activities such as reading, studying, and completing assignments. Specifically, time spent on academically related activities outside of class combined with time spent in class meetings is expected to be a minimum of 37.5 hours over the duration of the term for each credit hour.