El Paso Community College Syllabus Part II Official Course Description

SUBJECT AREA	Automotive Technology
COURSE RUBRIC AND NUMBER	AUMT 1319
COURSE TITLE	Automotive Engine Repair
COURSE CREDIT HOURS	32:4CreditsLecLab

I. Catalog Description

Covers the fundamentals of engine operation, diagnosis and repair. Emphasizes identification, inspection, measurements, disassembly, repair, and reassembly of the engine. May be taught manufacturer specific. (2:4). Lab fee.

II. Course Objectives

- A. Unit I. Shop Safety
 - 1. Work safely in an automotive shop.
 - 2. Explain laws regarding hazardous waste.
- B. Unit II. Engine Identification and removal
 - 1. Read and interpret a vehicle identification number.
 - 2. Use shop manuals or CD ROM to locate information pertaining to a specific engine.
 - 3. Remove an engine following manufacturer's procedures.
 - 4. Identify proper tools and equipment for the job.
- C. Unit III. Disassembly, Inspection, and Measuring
 - 1. Select and use tools and equipment.
 - 2. Remove engine components in the proper sequence.
 - 3. Mark and sort engine component where applicable.
 - 4. Determining the condition of engine components.
 - 5. Remove cylinder heads and visually inspect for defects. (ASE)
 - 6. Inspect pushrods, rocker arms, rocker arm pivots, and shafts for wear, bending, cracks, looseness, and blocked oil passages and repair or replace. (ASE)
 - 7. Inspect, test, and replace hydraulic or mechanical lifters. (ASE)
 - 8. Inspect and replace camshaft drives, including checking gear wear and backlash, sprocket and chain wear, overhead cam drive sprockets, drive belts, belt tension, and tensioners). (ASE)
 - 9. Inspect and measure camshaft journals and lobes. (ASE)
 - 10. Inspect and measure camshaft bearing surfaces for damage, out-of-bound, and alignment and determine needed repairs. (ASE)
 - 11. Measure camshaft timing. (ASE)
 - 12. Visually inspect engine block for cracks, passage condition, core and galley plug condition, and surface warpage and service block or determine needed repairs. (ASE)
 - 13. Inspect and repair damaged threads. (ASE)
 - 14. Remove cylinder wall ridges. (ASE)
 - 15. Inspect and measure cylinder walls for damage and wear and determine needed repairs. (ASE)
 - 16. Hone and clean cylinder walls. (ASE)

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- 17. Inspect and measure camshaft bearings for wear, damage, out-of -round, and alignment and determine needed repairs. (ASE)
- 18. Inspect camshaft for surface cracks and journal damage, check oil passage condition, measure journal wear, and service crankshaft or determine needed pair. (ASE)
- 19. Inspect and measure main and connecting rod bearings for damage clearance, and end play and determine needed repairs, including the proper selection of bearings.
- 20. Identify piston and bearing wear patterns that indicate connecting rod alignment and main bearing bore problems and inspect rod alignment and bearing bore condition. (ASE)
- 21. Inspect, measure, service, or replace pistons. (ASE)
- 22. Inspect, repair, or replace crankshaft vibration damper (harmonic balancer). (ASE)
- 23. Inspect crankshaft flange and flywheel/flexplate for burrs and repair as necessary. (ASE)
- 24. Inspect flywheel/flexplate, including ring gear, for cracks and wear; measure runout; and determine needed repairs. (ASE)
- 25. Inspect and replace pilot bushing. (ASE)
- 26. Inspect, measure, repair, or replace oil pumps, including gears, rotors, and housing; pressure relief devices; and pump drives. (ASE)
- D. Unit IV. Valve Train Service and Repair
 - 1. Inspect and test valve springs for squareness, pressure, and free height comparison and replace as necessary. (ASE)
 - 2. Inspect valve spring retainers, locks, and valve lock grooves. (ASE)
 - 3. Inspect valve guides for wear, check valve guide height and stem-to-guide clearance, and recondition/replace as necessary. (ASE)
 - 4. Inspect valves and resurface or replace. (ASE)
 - 5. Inspect valve seats and resurface or replace. (ASE)
 - 6. Check valve face-to-seat contact and valve seat concentricity (runout) and service seats and valves as necessary. (ASE)
 - 7. Check valve spring assembled height and valve stem height and service valve and spring assemblies as necessary. (ASE)
- E. Unit V. Engine Reassembly and Installation
 - 1. Reassemble engine parts using correct gaskets and sealants. (ASE)
 - 2. Select and use proper tools and equipment.
 - 3. Use shop manuals to locate engine specifications.
 - 4. Assemble components into the block.
 - 5. Install components into the cylinder head.
 - 6. Install cylinder head (s) on the block.
 - 7. Inspect auxiliary (balance), intermediate, idler, counterbalance (or silencer) shaft inspect shafts and support bearing for damage and wear; determine needed repairs; and reinstall and time. (ASE)
 - 8. Install new piston pins and bushings (as applicable). (ASE)
 - 9. Prime engine lubrication system. (ASE)
 - 10. Adjust valves on engines with mechanical or hydraulic lifters. (ASE)
 - 11. Adjust valves (mechanical and hydraulic lifters) (ASE)
 - 12. Replace valve stem seals. (ASE)
 - 13. Install cylinder heads and gaskets. (ASE)
 - 14. Inspect and replace pans, covers, gaskets, and seals. (ASE)
- F. Unit VI. Engine Wear and Malfunction Diagnosis
 - 1. Describe basic concept of internal combustion engine.
 - 2. Verify the customer complaint.
 - 3. Follow diagnostic routines by symptom.
 - 4. Verify engine diagnosis.
 - 5. Inspect engine assembly for fuel, oil, coolant, and other leaks and determine needed repairs. (ASE)
 - 6. Listen to engine noises; determine needed repair. (ASE)
 - 7. Determine correct service interval for oil, coolant, filter, timing belts, ignition system components, and fuel system components.

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- 8. Diagnose the cause of excessive oil consumption and unusual engine exhaust color, odor, and sound and determine needed repairs. (ASE)
- 9. Perform engine vacuum tests and determine needed repairs. (ASE)
- 10. Perform cylinder compression tests and determine needed repairs. (ASE)
- 11. Perform cylinder leakage tests and determine needed repairs. (ASE)
- 12. Perform oil pressure tests and determine needed repairs. (ASE)
- 13. Inspect, test, and replace water pump. (ASE)
- 14. Verify correct valve timing and determine needed repairs. (ASE)
- 15. Perform cooling system pressure test; check coolant; inspect and test radiator, pressure cap, and coolant recovery tank hoses, and determine needed repairs. (ASE)
- 16. Inspect and replace thermostat, by-pass, and housing. (ASE)
- 17. Inspect, test, and replace mechanical/electrical fans, fan clutch, fan shroud/ducting, and fan control devices. (ASE)

III. THECB Learning Outcomes (WECM)

- 1. Utilize appropriate safety procedures.
- 2. Explain engine operating principles.
- 3. Demonstrate engine diagnostic procedures.
- 4. Repair cylinder head, valve train, block assembly, lubrication, and cooling systems.

IV. Evaluation

- A. Unit exams will count 60% toward the final grade.
- B. Unit exams will count 40% toward the final grade
- C. Grading Scale
 - $\begin{array}{l} 90 \text{ to } 100 = \text{A} \\ 80 \text{ to } 89 = \text{B} \\ 70 \text{ to } 79 = \text{C} \\ 60 \text{ to } 69 = \text{D} \\ \text{Below } 60 = \text{F} \end{array}$
- D. Cheating will not be permitted. Any person caught cheating will receive a grade of zero for that exam.

V. Disability Statement (Americans with Disabilities Act [ADA])

EPCC offers a variety of services to persons with documented sensory, mental, physical, or temporary disabling conditions to promote success in classes. If you have a disability and believe you may need services, you are encouraged to contact the Center for Students with Disabilities to discuss your needs with a counselor. All discussions and documentation are kept confidential. Offices located: VV Rm C-112 (831-2426); TM Rm 1400 (831-5808); RG Rm B-201 (831-4198); NWC Rm M-54 (831-8815); and MDP Rm A-125 (831-7024).

VI. 6 Drop Rule

Students who began attending Texas public institutions of higher education for the first time during the Fall 2007 semester or later are subject to a 6-Drop limit for all undergraduate classes. Developmental, ESL, Dual Credit and Early College High School classes are exempt from this rule. All students should consult with their instructor before dropping a class. Academic assistance is available. Students are encouraged to see Counseling Services if dropping because exemptions may apply. Refer to the EPCC catalog and website for additional information.