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	**3 2 : 4** **Credits Lec Lab**

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)

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.

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

90 to 100 = A
80 to 89 = B
70 to 79 = C
60 to 69 = D
Below 60 = F

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.