AUTOMOTIVE TECHNOLOGY 41

COURSE SYLLABUS

Course Description:

Recommended: AT1 or pass the Auto Tech 1 Placement Test.
Principles of engine rebuilding, includes diagnosis, removing, disassembly, cleaning, inspection, machining, assembly, installing, and breaking-in period. Machining consists of boring, honing, valve and valve seat grinding, valve guide and valve seat replacement, and milling of cylinder heads and blocks.

Instructor: Harry Stockwell

School phone: 310-660-3593 X5303 call any time night or day and leave a message.

Text: Automotive Engines: Theory and Servicing by James Halderman
Publisher: Prentice Hall 7TH Edition

Student Materials:

Safety glasses REQUIRED
Coveralls or old clothes, No Shorts allowed in shop, only appropriate shirts and pants are to be worn in the shop according to industry standards and requirements
Coveralls or old clothes
Shop safe shoes or boots no sandles or slippers
Six inch steel ruler
Hand tools Recommended
Note book, note book paper, pen or pencils

Student Conduct:

No Parking in the work shop unless work is to be performed on the particular vehicle that day, Pertaining to class project. Points will be deducted from daily grade points for using the work shop for a PARKING LOT!!!!!
Radios off PLEASE
No smoking inside of the building.
PLEASE HELP KEEP THE SHOP CLEAN. CLEAN UP YOUR AREAS DAILY AND CLEAN UP SPILLS. PLEASE!!!!!

Methods of Instruction:

Lecture
Audio-visual
Demonstrations
Hands on application in the work shop

Method of Evaluation:

Shop work: 30% lab sheets
Written work: 25% homework, assignments.
Tests: 25% weekly exams.
Comprehensive Final Exam: 20%
Note: **Three days absence or excessive tardies will be reason** for dropping a student from class. Cheating on exams, on worksheets, or homework can and may result in expulsion from a course.
Phone the Instructor if you will be absent or if you will be tardy.

COURSE OUTLINE:

APROXIMATE TIME ALLOTTED IN WEEKS	MAJOR TOPICS
1.	ORIENTATION AND SAFETY Course requirements Safety information and test Engine construction and design Materials and manufacturing processes Four stroke cycle, cam and crank timing, valve types Piston and crank assembly
1.	Engine Removal Preparation, need for diagrams, notes and pictures Need for organization and procedures Safety precautions Draining fluids, disconnecting vehicles vacuum hoses and electrical components and tagging wires and hoses.
1.	CLEANING PROCEDURES Steam Cleaning, Hot Tank solutions, jet washer, and cleaning oven Hand cleaning, wire wheel, hand scraping, cold spray, draw filing, vapor degreaser, ultrasonics, and abrasive blasting.
2.	ENGINE DISASSEMBLY Identifying signs of wear and leakage Sequence of organized disassembling Ridge removal, removing harmonic balancer or crank hub Marking bearing caps, piston removal Pressing piston pins Crankshaft storage Cylinder head disassembly procedures Cam bearing, soft core and oil gallery plug removal
2.	MEASUREMENT AND INSPECTION Use of a ruler Inside and outside micrometers, Telescopic gauges, hole gauges, Dial indicators, Alignment fixtures Feeler gauges, Go-no-go gauges Dividers V-blocks Spring testers

Bore gauges

1. MEASUREMENT AND INSPECTION – CONTINUED

TERMS

Taper, Out of round, Straightness
Valve Stem Height
Installed spring height and clearance
Measuring cylinder walls
Crankshaft, Camshaft
Valves and guides
Pistons
Saddles and bores
Pushrod concentricity
Valve margin
Connecting rod length
Piston compression height
Indicators of cracks, porosity, scuffing, galling, chipping, pitting, and overheating.
Crack detection – magnaflux, zyglo, x-ray, and dye penetrants.

3. MACHINING PROCESSES

Valve and valve seat grinding,
Valve guide and valve seat replacement,
Cylinder block and cylinder head milling.
Engine Block Machining - Boring, honing, milling,
Piston pin removal and installation.
Align boring and honing practices
Crankshaft grinding practices
Connecting rod resizing
Cylinder block boring and honing
Leak testing valves and seats
Crack repair
Machining for valve seals

3. ENGINE ASSEMBLY

Block and Crankshaft preparation – cleanliness
Torque procedures
Installation of cam bearings, core plugs, and oil gallery plugs
Crankshaft assembly procedures, checking for bind and clearance
Piston rings end gaps and staggering gaps
Piston assembly installation
Cylinder head installation and valve train installation
Decreeing camshaft and crankshaft
Oil pump and drive installation
.Manifolds, oil pan and timing chain cover installation
Transmission and clutch installation

1	ENGINE INSTALLATION Safety precautions Common installation problems Wrong motor mounts or mounted on wrong side Omission of engine and transmission cooler lines Linkages subject to damage Cross threading bolts and tubing fittings Double checking all Installation bolts Installing hood correctly
1	INITIAL START UP AND BREAK IN PROCEDURES Check all fluid levels – Engine oil and coolant, power steering, transmission, and fuel Operation of the throttle and transmission shifter Prime the engine oil system Start and break- in procedure for the camshaft and lifter assembly, how to seat piston rings. Final checks, adjustments, check oil pressure, ignition timing, fuel delivery system, transmission and brakes FINAL EXAM

IMPORTANT DATES:
September 1 - Labor Day holiday Monday.
September 5 – Last day to drop and be eligible for a refund.
September 5 - Last day to drop without notation on record.
October 10 Last day to apply for Graduation or certificate of completion.
November 11- Veterans Day Holiday, Tuesday
November 14 - Last day to drop with a "W" grade Friday.
November 27 – November 30 Thanksgiving Break Thursday - Sunday
December 11 – Clean up and Final Exam
December 12 - Last Day of Semester Friday

SLO#1: Safety Exam - The students will be given an in class exam, based on readings, classroom discussions and demonstrations, the student will be able to work in the Automotive Shop safely and pass the Automotive Technology Safety Exam and demonstrate the proper use of safety precautions.
SLO #2: Cylinder Head Recondition – The student will recondition an automotive cylinder head using manufacturer procedures and specifications.
SLO #3: Engine Inspection and Test- The student will disassemble, inspect, measure and evaluate the parts of an automotive engine, then reassemble and test the engine using manufacturer procedures and specifications.

Disability: El Camino College adheres to all applicable federal, state and local laws, regulations and guidelines with respect to providing reasonable accommodations for students with temporary and permanent disabilities. If you have a disability that may adversely affect your work in this class, I encourage you to register with the Special Resource Center (SRC) and talk to me ab out how I can best help you. All disclosures of disabilities will be kept strictly confidential. NOTE: For more information about the Special Resource Center, please call 6603295 or visit (SRC) Room F-10.