EL DORADO UNION HIGH SCHOOL DISTRICT
Educational Services

ADVANCED AUTOMOTIVE TECHNOLOGY (541)

DEPARTMENT:	Trades & Industrial Education
DISTRICT SITES:	EHS, ORHS, PHS
LENGTH OF COURSE:	Year
CREDIT:	5 units each semester
GRADE LEVEL:	Advanced Automotive Technology - 11, 12
PREREQUISITES:	Automotive Technology - Shop Fundamentals/Instructor's permission

BOARD OF TRUSTEES ADOPTION DATE:

COURSE DESCRIPTION: Advanced auto is an extension of the skills and knowledge acquired in automotive Technology I. This is a project oriented/hands-on course designed to give the student an opportunity to develop advanced diagnostic, repair, and managerial skills as applied to the automotive industry. In the beginning class, students will remove and replace parts; in the advanced class, students will remove and repair parts.

SUBMITTED BY: Chuck Breault, PHS

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Revised 1/13/93; 11/4/93, 1/11/94

AUTO MECHANICS

TABLE OF CONTENTS

EL DORADO UNION HIGH SCHOOL DISTRICT

Department: Trades and Industry
Course Title: Advanced Automotive Technology

UNIT 1: GENERAL SHOP SAFETY

GOAL: Students will know and understand basic safety practices and procedures associated with automotive mechanics.

OBJECTIVES The student will:	ACTIVITIES
1. Demonstrate a knowledge of general shop safety by means of a written safety test with a minimum score of 100%.	1. Safe hand tool practices. 2. Safe machine tool practices. 3. Importance of proper shop clothing. 4. Proper safety practices concerning oxy-acet welding.
2. Demonstrate a working knowledge of good shop practices by the manner in which each activity is carried out.	

UNIT 2: PRECISION TOOLS AND MEASUREMENT

GOAL: Students will know and understand how to use precision measuring tools to measure objects to within 0.001" accuracy.

OBJECTIVES The student will:	ACTIVITIES
1. Identify precision measuring tools and their applications.	1. Precision measuring tools ● depth micrometers ● outside micrometers ● inside micrometers ● vernier calipers ● dial indicators
2. Measure objects using precision measuring tools to a specific standard.	2. Measure objects to determine if object is within a specified tolerance 3. Determine if object can be reused, replaced or machined.

EL DORADO UNION HIGH SCHOOL DISTRICT

Department: Trades and Industry
Course Title: Advanced Automotive Technology

UNIT 3: ENGINE CONSTRUCTION AND OPERATION

GOAL: Students will know and understand the fundamentals of the basic two (2) and four (4) stroke internal combustion machine.

OBJECTIVES The student will:	ACTIVITIES
1. Demonstrate a knowledge of the two (2) and four (4) stroke engine by means of passing a written test.	1. Two stroke engine: ● intake ● primary compression ● transfer ● secondary compression ● power ● exhaust 2. Four stroke engine: ● intake ● compression ● power ● exhaust 3. Disassemble and rebuild engine identifying all parts and their function. Determine each serviceability.
2. Identify internal parts of the basic internal combustion engine as presented by the instructor.	

UNIT 4: AUTOMOTIVE IGNITION SYSTEM

GOAL: Students will demonstrate a working knowledge of the principles of the conventional ignition system.

OBJECTIVES The student will:	ACTIVITIES
1. Demonstrate his knowledge of the ignition system by passing a written test.	1. Fundamentals of electricity: ● definition of terms ● basic circuitry 2. Automotive ignition system: ● identification of parts ● function of parts
2. Demonstrate his knowledge of the ignition system through practical application in wiring the ignition system on a test engine.	
3. Demonstrate his knowledge by removing and replacing a distributor on a working engine. Advanced students will remove and repair a distributor on a working engine.	
4. Troubleshoot and diagnose ignition malfunction on standard electronic ignition systems.	

EL DORADO UNION HIGH SCHOOL DISTRICT

Department: Trades and Industry
Course Title: Advanced Automotive Technology

UNIT 5: FUNDAMENTALS OF ELECTRICAL GENERATION; ALTERNATORS; BATTERY

GOAL: Students will demonstrate a working knowledge of the electrical charging system of the modern automobile.

OBJECTIVES The student will:	ACTIVITIES
1. Demonstrate a knowledge of the charging system by passing a written evaluation.	1. Fundamentals of electrical generation: ● generation ● controls 2. Alternators ● external regulator ● internal regulator 3. Battery ● load testing ● specific gravity
2. Demonstrate a working knowledge of the charging system by proper use and diagnoses with the V.A.T. 28 system tester.	
3. Demonstrate a working knowledge of the battery by properly load testing and checking specific gravity of the modern battery.	

UNIT 6: ELECTRICAL MOTORS

GOAL: Students will demonstrate a working knowledge of the automotive starter system.

OBJECTIVES The student will:	ACTIVITIES
1. Demonstrate a knowledge of the starting system by passing a written evaluation.	1. Electrical Motors ● controls ● gear reduction ● bendix mechanism
2. Demonstrate a working knowledge of the starting system by properly testing and diagnosing the components using proper test equipment.	

EL DORADO UNION HIGH SCHOOL DISTRICT

Department: Trades and Industry
Course Title: Advanced Automotive Technology

UNIT 7: FUEL SYSTEMS

GOAL: Students will demonstrate a knowledge of the carburetor used on the modern automobile.

OBJECTIVES The student will:	ACTIVITIES
1. Demonstrate a knowledge of the carburetor through a written evaluation.	1. Carburetor: ● coke ● float ● pump ● idle ● main ● power
2. Demonstrate a knowledge of the carburetor by identifying the six (6) circuits of a working model.	
3. Advanced students will remove and repair parts.	
4. Troubleshoot and repair fuel injection systems, both TBI and multi-port.	

UNIT 8: ELECTRONIC ENGINE CONTROLS

GOAL: Students will demonstrate a working knowledge of the smog systems and their interrelated effect on the vehicle.

OBJECTIVES The student will:	ACTIVITIES
1. Demonstrate a knowledge of the modern smog systems by passing a written test on the matter.	1. Engine controls: ● e.g.r. system ● catalytic converts ● H.E.I. ● A.I.R. systems
2. Demonstrate a working knowledge of the systems by following a manufacturer's logic tree and diagnose the malfunction.	
3. Demonstrate a working knowledge of the test equipment used to test for computer malfunctions.	
4. Advanced students will remove and repair parts.	
5. Use a O.J.C. Scanner to diagnosis engine component malfunctions.	

EL DORADO UNION HIGH SCHOOL DISTRICT

Department: Trades and Industry
Course Title: Advanced Automotive Technology

UNIT 9: SUSPENSION SYSTEMS - STEERING GEOMETRY

GOAL: Students will demonstrate a knowledge of the automotive suspension system.

OBJECTIVES The student will:	ACTIVITIES
1. Demonstrate a knowledge of suspension by passing a written test.	1. Steering: ● caster ● camber ● toe-in ● S.A.I. steering axis inclination ● thrust angle 2. Types of suspensions: ● conventional ● I.R.S. ● McPherson strut
2. Demonstrate a knowledge of adjusting and aligning front and rear ends.	

UNIT 10: BRAKE SYSTEMS

GOAL: Students will demonstrate a working knowledge of the automotive braking system.

OBJECTIVES The student will:	ACTIVITIES
1. Demonstrate a knowledge of the brake system by passing a written test.	1. Types of brakes: ● drum ● power ● disc ● combination ● anti-lock
2. Demonstrate a working ability to remove and replace brake shoes.	
3. Demonstrate a working ability to turn drums and disc rotors.	
4. Demonstrate a working ability to bleed hydraulic brakes.	
5. Advanced students will remove and repair parts.	
6. Diagnosis and repair anti-lock brake systems.	

EL DORADO UNION HIGH SCHOOL DISTRICT

Department: Trades and Industry
Course Title: Advanced Automotive Technology

UNIT 11: COOLING SYSTEM

GOAL: Students will demonstrate a working knowledge of the automobile cooling system.

OBJECTIVES The student will:	ACTIVITIES
1. Demonstrate a knowledge of the cooling system by passing a written test.	1. Cooling system: ● radiator ● water pump ● engine block ● heater ● thermostat ● anti-freeze
2. Demonstrate a working knowledge of the cooling system through the use of the system pressure test.	
3. Demonstrate a knowledge of how to check anti-freeze level in coolant.	
4. Advanced students will remove and repair parts.	

UNIT 12: AIR CONDITION SYSTEM OPERATION

GOAL: Students will demonstrate a working knowledge of the modern automotive air conditioning system.

OBJECTIVES The student will:	ACTIVITIES
1. Demonstrate a knowledge of the a/c system by passing a written test.	1. System components: ● compressor ● evaporators ● condenser ● dryers ● controls ● freon
2. Demonstrate a working knowledge of the system tester.	
3. Demonstrate a knowledge of component replacement.	
4. Demonstrate a working ability to recharge the a/c system.	
5. Advanced students will remove and repair parts.	

EL DORADO UNION HIGH SCHOOL DISTRICT

Department: Trades and Industry
Course Title: Advanced Automotive Technology

UNIT 13: ENGINE REBUILDING PROCESS

GOAL: Students will demonstrate a knowledge of the engine rebuilding process.

OBJECTIVES The student will:	ACTIVITIES
1. Demonstrate a knowledge of engine rebuilding by passing a written test.	1. Engine tear down: ● head removal ● block disassembly ● measuring tools
2. Demonstrate a knowledge of engine rebuilding through instructor observation and practical application.	2. Engine machine work: ● valve job ● cylinder boring ● block prep
3. Advanced students will remove and repair parts.	3. Engine assembly: ● plastic gauge ● short block ● long block

UNIT 14: COMPUTERS AND THE CAR

GOAL: The students will demonstrate knowledge of the placement and uses of computers in the modern automobile.

OBJECTIVES The student will:	ACTIVITIES
1. Name the computers used and describe their function.	1. On-board computer reading.
2. Test the various components for malfunction.	2. Interpret computer read-outs.
3. Use a computer to diagnose malfunctions.	

EL DORADO UNION HIGH SCHOOL DISTRICT

Department: Trades and Industry
Course Title: Advanced Automotive Technology

UNIT 15: BOOKKEEPING

GOAL: The student will demonstrate the knowledge of the bookkeeping procedures necessary to prepare a bill for a customer.

OBJECTIVES The student will:	ACTIVITIES
1. Use a table to find flat rate.	1. Prepare computerized repair order.
2. Order parts.	2. Flat Rate Manual.
3. Prepare a time sheet.	3. Time Estimates.
4. Write an estimate for a job.	4. Cost Accounting
5. Prepare a bill for a job.	
6. Make change for the payment received.	
7. Keep records of all activities.	
8. Use a computer for record keeping.	