Modern Automotive Technology
Chapter 1
The Automobile
Learning Objectives

- Identify and locate the most important parts of a vehicle
- Describe the purpose of the fundamental automotive systems
- Explain the interaction of automotive systems
- Describe major automobile design variations
- Discuss safety procedures when working on a cooling system
Basic Automotive Systems

- Fuel tank
- Fuel pump
- Fuel filter
- Fuel injector
- Intake manifold
- Throttle body
- Air in
- Engine
- Transmission
- Clutch
- Drive train system
- Starting system
- Exhaust manifold
- Oil pan
- Cooling system
- Charging system
- Lubrication system
- Muffler
- Exhaust system
- Catalytic converter
- Rear axle
- Drive shaft
- Power out
- Exhaust out
- Fuel in
Chapter 1

1. The TRANSAXLE contains a transmission and a differential in one case.

2. The CLUTCH is used to engage or disengage the engine from the transmission.

3. The LUBRICATION SYSTEM helps reduce friction and wear between internal engine parts.
Transverse Mounted Engine and Transaxle
Engine Lubrication System
Chapter 1

4. The AUTOMATIC TRANSMISSION uses an internal hydraulic system to shift gears.

5. The DRIVE TRAIN transfers turning force from the engine crankshaft to the drive wheels.
Automotive Systems

- Engine
- Clutch
- Manual Transmission
- Drive Shaft
- Differential
- Rear Drive Axle
Chapter 1

6. The **CHARGING SYSTEM** replaces electrical energy used during the starting system operation.

7. The **IGNITION SYSTEM** produces extremely high voltage that operates the spark plugs.
Charging and Starting Systems

Starting system
- Small current activates starter
- Ignition switch
- Flywheel gear
- Starting motor
- High current flow to starter

Charging system
- Voltage to activate regulator
- Voltage regulator
- Alternator
- Current flows through and recharges battery

Battery

A

B
Engine Ignition System
Gasoline Injection System

When open, fuel injector (fuel valve) sprays fuel toward intake valve.

Air enters through the throttle valve.

Spark plug ignites mixture.

Electric fuel pump transfers gasoline from the tank.

Wires to engine sensors connect with the computer.
8. A MANUAL TRANSMISSION allows the driver to change gear ratios and engine torque going to drive wheels.

9. The DRIVE SHAFT transfers power from the transmission to the rear axle assembly.
Rear Differential & Axle System
10. The **REAR AXLE ASSEMBLY** contains a differential and two axles.
The Automobile

14. Shock Absorber 15. Suspension System
16. Brake Assembly 17. Drive Axle
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