



SNS COLLEGE OF TECHNOLOGY
COIMBATORE - 35
DEPARTMENT OF MECHANICAL ENGINEERING



Classification of Engines

1. Based on Energy Source

1. **Internal Combustion Engines (ICE):**
 - Energy from combustion of fuel inside the engine.
 - Examples: Petrol, diesel, gas engines.
 2. **External Combustion Engines (ECE):**
 - Combustion occurs outside the engine; heat is transferred to the working fluid.
 - Examples: Steam engines, steam turbines.
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2. Based on Working Cycle

1. **Four-Stroke Engines:**
 - Complete thermodynamic cycle in four strokes of the piston (intake, compression, power, exhaust).
 - Examples: Most automotive engines.
 2. **Two-Stroke Engines:**
 - Complete thermodynamic cycle in two strokes of the piston (intake/exhaust, compression/power).
 - Examples: Motorcycles, small power tools.
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3. Based on Fuel Type

1. **Petrol Engines:**
 - Spark ignition engines using petrol.
 - Examples: Cars, motorcycles.
2. **Diesel Engines:**
 - Compression ignition engines using diesel.
 - Examples: Trucks, buses.
3. **Gas Engines:**
 - Use gaseous fuels like natural gas, CNG, or biogas.
 - Examples: Generators, industrial engines.

4. Based on Ignition System

1. **Spark Ignition (SI) Engines:**
 - Ignition initiated by a spark plug.
 - Examples: Petrol engines.
2. **Compression Ignition (CI) Engines:**
 - Ignition initiated by heat from compressed air.
 - Examples: Diesel engines.

5. Based on Number of Cylinders

1. **Single-Cylinder Engines:**
 - One cylinder; simple, low power.
 - Examples: Small motorcycles.
2. **Multi-Cylinder Engines:**
 - Multiple cylinders for higher power output.
 - Examples: Cars, trucks.

Components of an Engine and Their Functions

Major Components:

1. **Cylinder**
 - Houses the combustion process.
 - Function: Contains the piston, where fuel combustion occurs.
2. **Piston**
 - A cylindrical component moving back and forth inside the cylinder.
 - Function: Converts pressure energy from combustion into mechanical energy.
3. **Connecting Rod**
 - Connects the piston to the crankshaft.
 - Function: Transmits motion and force from the piston to the crankshaft.
4. **Crankshaft**
 - Rotating shaft driven by the piston through the connecting rod.
 - Function: Converts reciprocating motion into rotational motion.
5. **Cylinder Head**
 - Covers the top of the cylinder, housing valves and spark plugs/injectors.
 - Function: Seals the combustion chamber and directs fuel-air mixture and exhaust gases.
6. **Valves**
 - **Intake Valve:** Allows the air-fuel mixture (SI) or air (CI) into the cylinder.

- **Exhaust Valve:** Releases combustion gases.
 - Function: Regulate flow in and out of the cylinder.
 - 7. **Camshaft**
 - A shaft with cams that operate the valves.
 - Function: Opens and closes valves in sync with the engine cycle.
 - 8. **Spark Plug (SI Engines)**
 - Produces a spark to ignite the air-fuel mixture.
 - Function: Initiates combustion.
 - 9. **Fuel Injector (CI Engines)**
 - Injects fuel directly into the combustion chamber.
 - Function: Ensures efficient fuel delivery.
 - 10. **Flywheel**
 - A heavy rotating disc attached to the crankshaft.
 - Function: Stores rotational energy and ensures smooth operation by minimizing speed fluctuations.
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Auxiliary Components:

1. **Carburetor**
 - (Older engines) Mixes air and fuel in the correct ratio.
 - Function: Supplies the air-fuel mixture to the cylinder.
 2. **Turbocharger**
 - Uses exhaust gases to compress intake air.
 - Function: Improves engine efficiency and power.
 3. **Radiator**
 - Part of the cooling system.
 - Function: Dissipates excess heat from the engine.
 4. **Oil Pump**
 - Circulates lubricant throughout the engine.
 - Function: Reduces friction and cools moving parts.
 5. **Exhaust System**
 - Includes manifold, catalytic converter, and muffler.
 - Function: Removes exhaust gases and reduces noise.
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Functions of an Engine

1. **Energy Conversion:** Converts chemical energy of fuel into mechanical energy.
2. **Power Generation:** Provides power to vehicles, machinery, or power plants.
3. **Heat Management:** Manages heat generated during combustion for efficiency.
4. **Emission Control:** Incorporates systems to reduce pollutants in exhaust gases.