

# Automobile Engineering



## UNIT 1 – Introduction to Automobiles

### 1.1 Concept and Classification of Automobiles

#### What is an Automobile?

An **automobile** is a **self-propelled vehicle** used for transportation of people or goods on roads. It moves without the help of animals or humans pulling it.

“Auto” = *self*, “Mobile” = *moving* ➡ *Self-moving machine*.

#### Main Features of an Automobile:

- Has its **own engine**
- Can carry **passengers or goods**
- Runs on **wheels**
- Needs **fuel or electricity**

#### Classification of Automobiles:

##### ◆ Based on Purpose:

Type	Example
Passenger Vehicle	Car, Bus, Bike
Goods Vehicle	Truck, Pickup Van
Special Purpose	Fire Truck, Ambulance

##### ◆ Based on Fuel Type:

- Petrol vehicle
- Diesel vehicle
- Electric vehicle (EV)

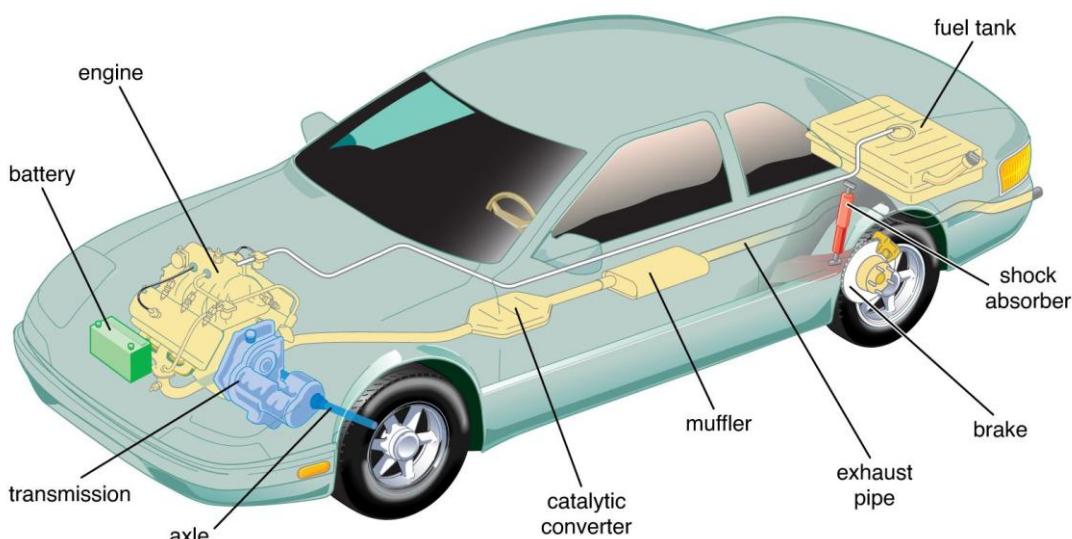
- **Hybrid vehicle** 

- ◆ **Based on Number of Wheels:**

- 2-Wheeler  (Scooter, Bike)
- 3-Wheeler  (Auto)
- 4-Wheeler  (Car)
- 6 or More Wheels  (Truck, Bus)

- ◆ **Based on Transmission:**

- **Manual Transmission** (Gear by hand/foot)
- **Automatic Transmission** (No clutch, just drive)
- **Semi-automatic**



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## \* **1.2 Vehicle Layout and Its Types**

### **What is Vehicle Layout?**

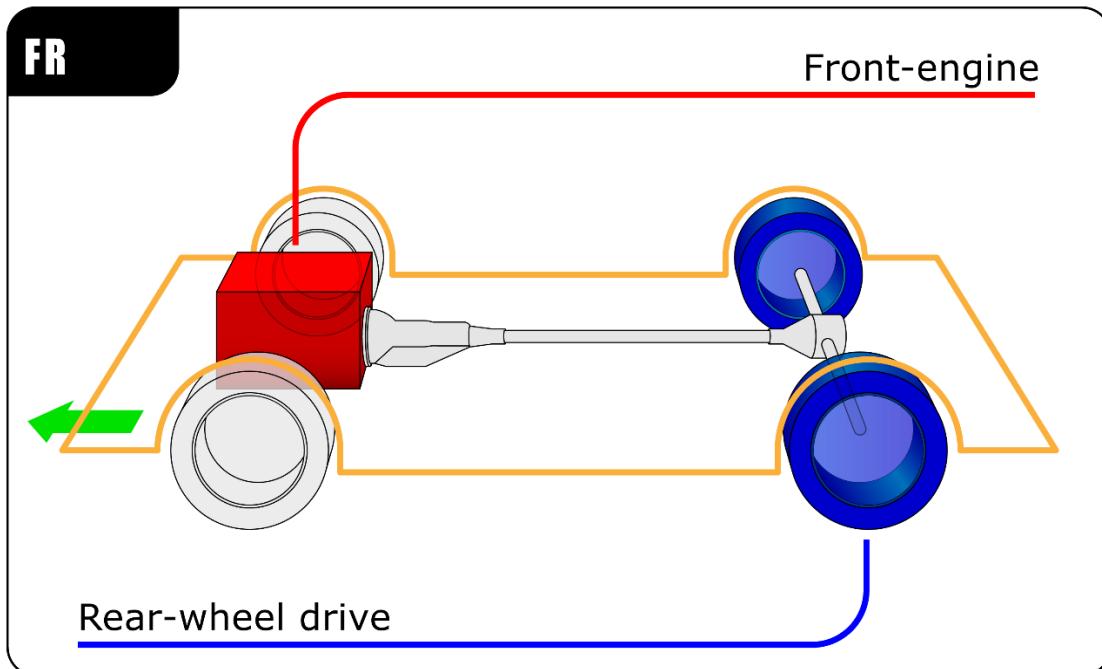
It means the **position of engine, transmission, and driven wheels** in a vehicle.

 Affects the balance, speed, space, and control of the vehicle.

## Types of Vehicle Layouts:

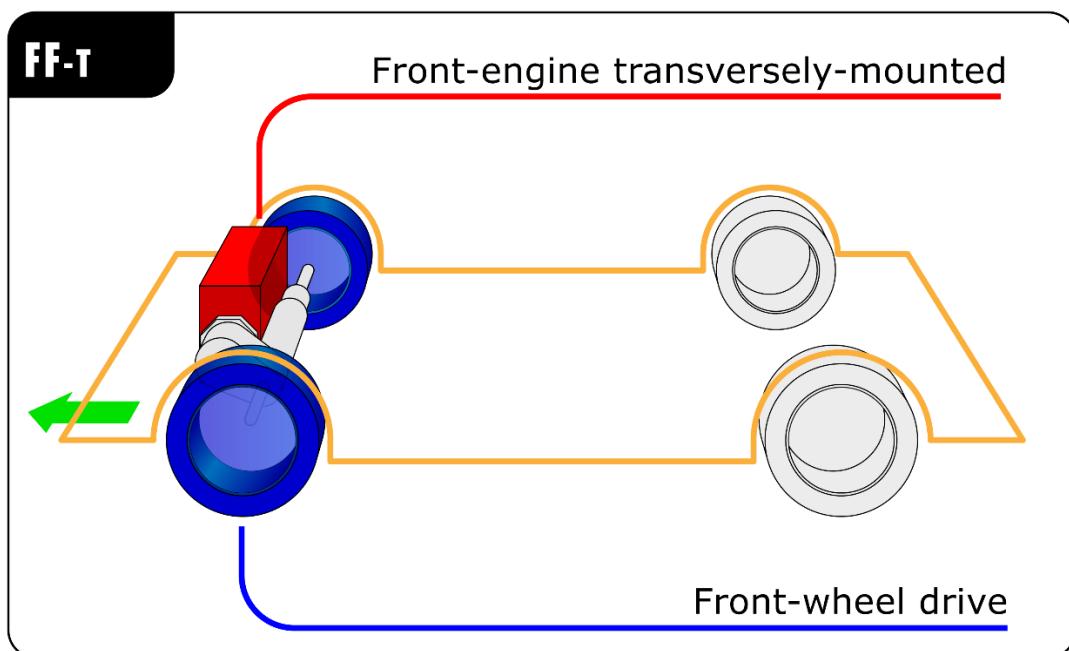
### 1. Front Engine – Rear Wheel Drive (FR)

- Engine at front, rear wheels drive
- Eg: Old Ambassador, SUVs



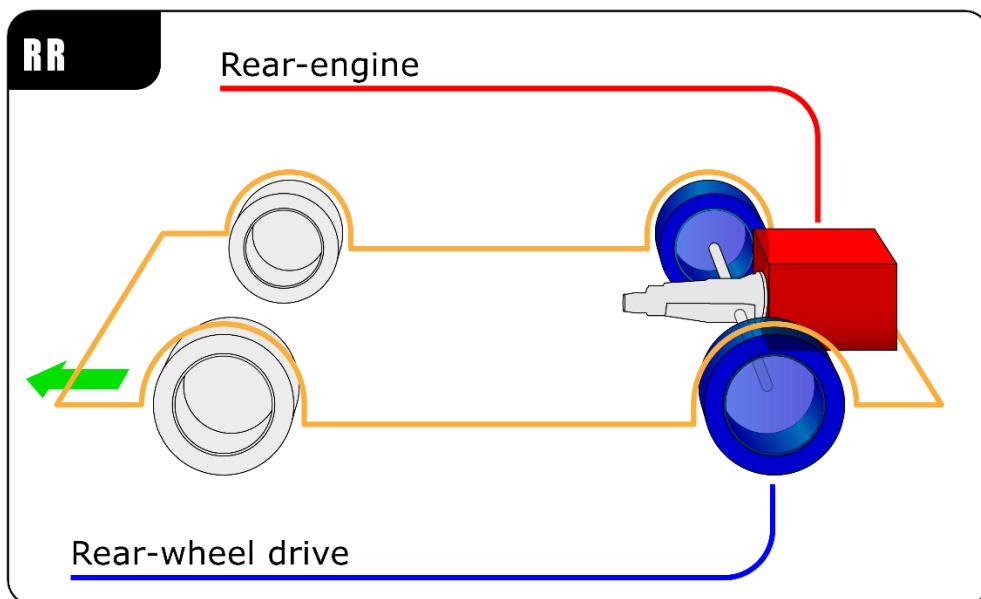
### 2. Front Engine – Front Wheel Drive (FF)

- Engine & drive both in front
- Most common in modern cars 🚗 (Maruti, Hyundai)



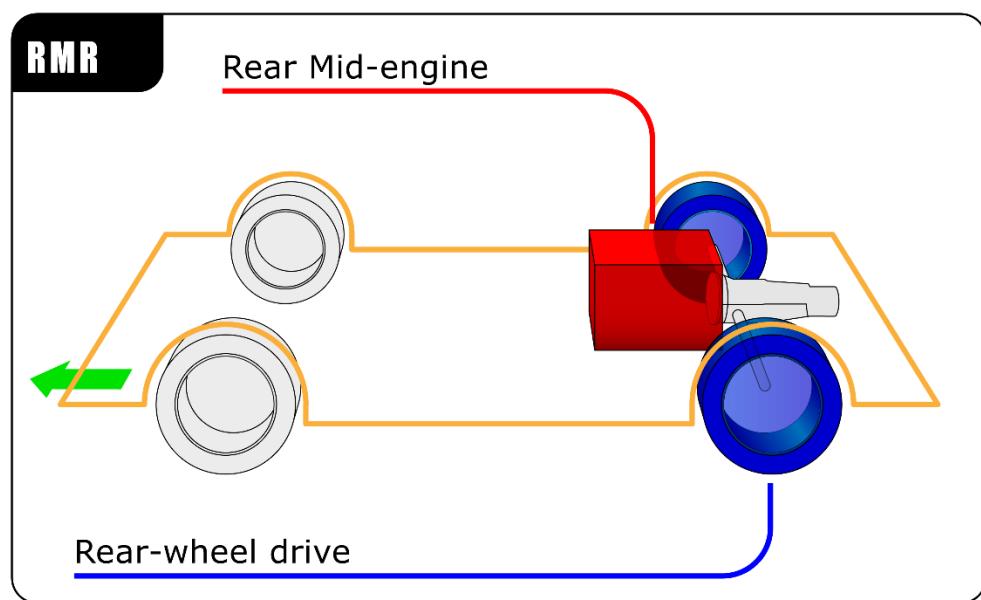
### 3. Rear Engine – Rear Wheel Drive (RR)

- Eg: Old Volkswagen Beetle
- Not common today



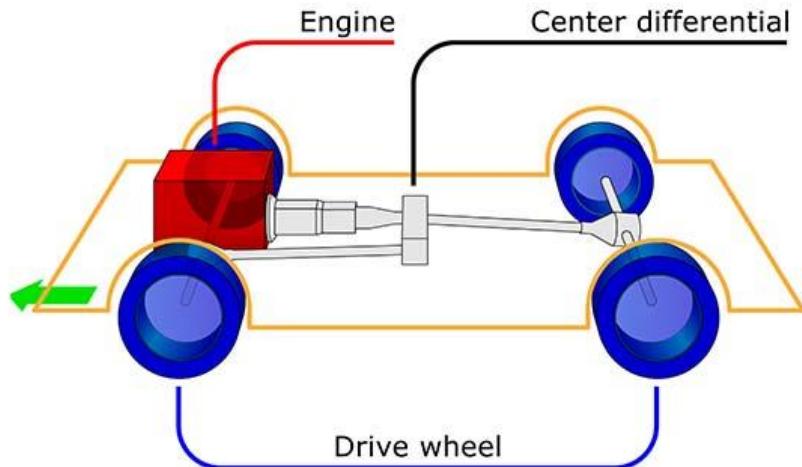
### 4. Mid Engine – Rear Wheel Drive

- Sports cars & F1 cars 🏎️
- Good balance & speed



### 5. All-Wheel Drive (AWD) or 4x4

- Power to all 4 wheels
- Used in SUVs, off-roaders 🚛



## 1.3 Function of Chassis and Frame

### What is Chassis?

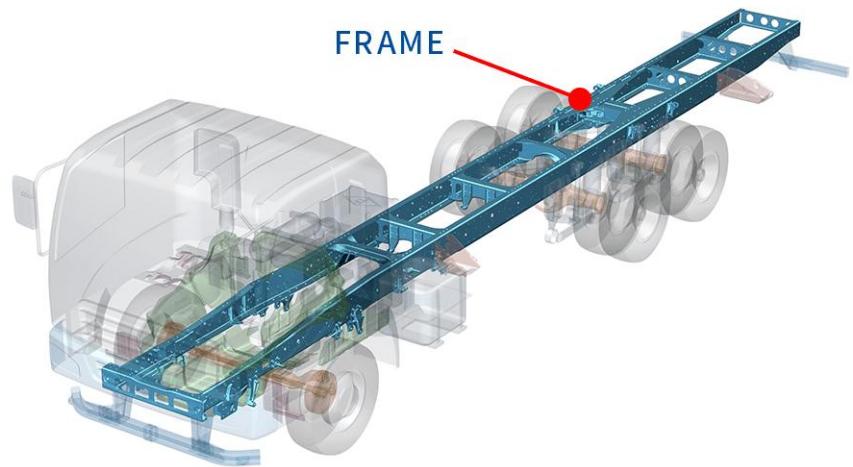
The **main supporting structure** of a vehicle. It holds everything: engine, wheels, suspension, body, etc.

Think of it as the **backbone or skeleton** of a vehicle.



### What is Frame?

Frame is the **base structure** that supports the chassis. In many modern cars, chassis & frame are combined (monocoque).



#### Main Functions:

- Support engine and all vehicle parts
- Absorb shocks & vibrations
- Maintain vehicle shape
- Withstand load and stress
- Provide safety and strength 🤷



## 1.4 Nomenclature of Car Body



### Nomenclature = Naming of car body parts



Helps in identifying, ordering, or repairing car components.

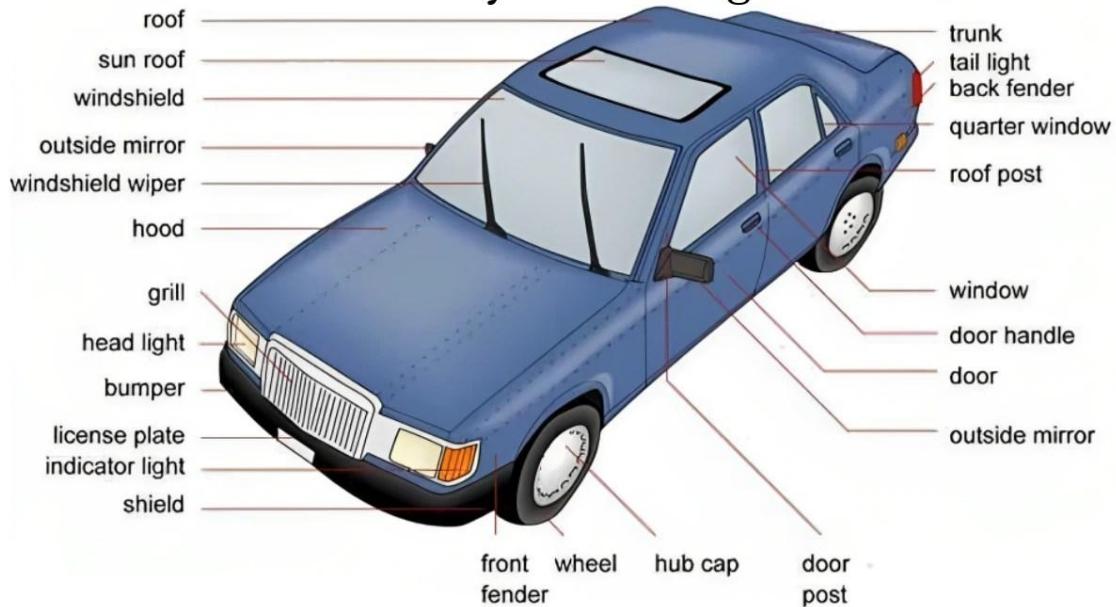


#### Main Body Parts (External):

- Bonnet (hood)
- Bumper
- Fender
- Roof
- Windshield
- Trunk (boot)

- Doors
- Headlight, Taillight
- Grille
- A-pillar, B-pillar, C-pillar (support columns)

## Car Body Parts Diagrams



### 💡 Real-Life Use:

When you go to a garage and say "My bumper is damaged" — you're using **car body nomenclature** 😊



## Suggestion Paper

### 👉 Short Questions (2–3 marks)

1. Define an automobile.
  2. Mention two types of vehicle layouts.
  3. What is the function of a chassis?
  4. Name any two external parts of a car body.
  5. Write any two advantages of front-engine layout.
  6. Classify vehicles based on fuel used.
  7. Define frame.
  8. What is nomenclature of car body?
  9. Give two examples of special purpose vehicles.
  10. Name the pillars used in car body structure.
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### ✍ Long Questions (5–7 marks)

1. Explain the concept of automobile and its classification with examples.
2. Describe different types of vehicle layouts with neat sketches.
3. What are the main functions of chassis and frame in a vehicle?
4. Explain nomenclature of car body with suitable diagram.
5. Compare FR (front engine–rear wheel drive) and FF (front engine–front wheel drive) layout.
6. List and explain different classifications of vehicles based on purpose and design.
7. Describe various body parts in a car and explain their functions.
8. Differentiate between chassis and frame with examples.
9. Explain any four types of car layouts with neat diagrams.
10. What is the role of vehicle layout in vehicle performance?

## MCQ Sheet

1. An automobile is a:
  - a) Machine carried by animals
  - b) Self-propelled vehicle**
  - c) Airplane
  - d) Hand-pulled cart
  
2. Which layout is most common in modern passenger cars?
  - a) Rear engine – rear wheel drive
  - b) Front engine – front wheel drive**
  - c) Front engine – rear wheel drive
  - d) Mid engine – rear wheel drive
  
3. The main function of chassis is to:
  - a) Paint the car
  - b) Support the vehicle components**
  - c) Make car faster
  - d) Provide air conditioning
  
4. Which of the following is not a classification based on fuel?
  - a) Petrol
  - b) Diesel
  - c) Leather**
  - d) Electric
  
5. All-wheel drive vehicles:
  - a) Only rear wheels drive
  - b) All four wheels receive power**
  - c) Only front wheels drive
  - d) No wheels are powered
  
6. The vertical support between front and rear doors is called:
  - a) A-pillar
  - b) B-pillar**
  - c) C-pillar
  - d) Fender

7. Which of these is a special purpose vehicle?

  - a) Sedan
  - b) Pickup
  - c) SUV
  - d) Ambulance**
8. The structure that absorbs load and supports engine is called:

  - a) Hood
  - b) Dashboard
  - c) Frame**
  - d) Roof
9. Which is a mid-engine layout example?

  - a) Auto-rickshaw
  - b) SUV
  - c) Formula One car**
  - d) Bus
10. Nomenclature of car body helps in:

  - a) Driving
  - b) Coloring
  - c) Identifying car parts**
  - d) Speed increase