**🔹 Types of Constraints in MySQL**

**1. NOT NULL**

* Ensures a column **cannot have NULL values**.

CREATE TABLE Customers (

customer\_id INT NOT NULL,

name VARCHAR(100) NOT NULL

);

**2. UNIQUE**

* Ensures all values in a column are **unique** (no duplicates).

CREATE TABLE Users (

email VARCHAR(100) UNIQUE,

phone VARCHAR(15) UNIQUE

);

**3. PRIMARY KEY**

* Combines NOT NULL + UNIQUE.
* A table can have **only one primary key** (single or composite column).

CREATE TABLE Orders (

order\_id INT PRIMARY KEY,

order\_date DATE NOT NULL

);

**4. FOREIGN KEY**

* Creates a **link between two tables**.
* Ensures that the value in one table exists in another table.

CREATE TABLE Orders (

order\_id INT PRIMARY KEY,

customer\_id INT,

FOREIGN KEY (customer\_id) REFERENCES Customers(customer\_id)

);

**5. CHECK**

* Ensures that values in a column satisfy a condition.
* (Supported from MySQL 8.0+).

CREATE TABLE Employees (

emp\_id INT PRIMARY KEY,

age INT CHECK (age >= 18)

);

**6. DEFAULT**

* Sets a default value for a column if no value is provided.

CREATE TABLE Accounts (

acc\_id INT PRIMARY KEY,

balance DECIMAL(10,2) DEFAULT 0.00

);

**7. AUTO\_INCREMENT**

* Automatically generates a unique number when a new row is inserted.
* Mostly used for **primary keys**.

CREATE TABLE Products (

product\_id INT AUTO\_INCREMENT PRIMARY KEY,

product\_name VARCHAR(100)

);

**🔹 Summary Table of Constraints**

| **Constraint** | **Description** |
| --- | --- |
| **NOT NULL** | Column cannot store NULL values. |
| **UNIQUE** | Column must have unique values. |
| **PRIMARY KEY** | Unique + Not Null (only one per table). |
| **FOREIGN KEY** | Links two tables (referential integrity). |
| **CHECK** | Ensures values meet a condition. |
| **DEFAULT** | Provides a default value. |
| **AUTO\_INCREMENT** | Auto generates sequential numbers. |

✅ Constraints are the backbone of **data validation and integrity** in MySQL.