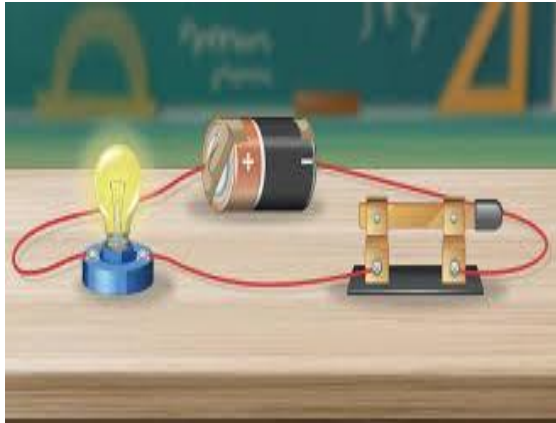


An Autonomous Institution
Coimbatore-35

Department of Computer Science and Engineering

23EET103-Electric Circuits and Electron Devices

I B.E. CSE-A / II SEMESTER



Empathize

Understand the User's Needs




Step into the User's Shoes



Electric Circuits and Electron Devices

Fundamentals of DC Circuits

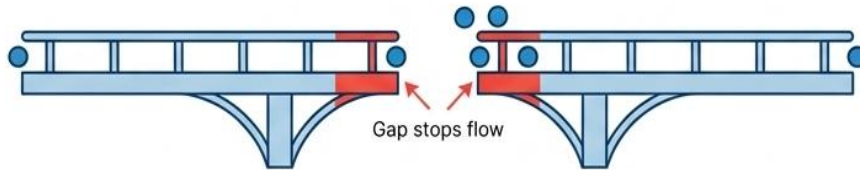
Everyday Language vs. Engineering Reality

	Literal Meaning	Technical Meaning
Electric	Related to electricity, charge, and energy. 	
Circuit	A complete round path or closed route.	A complete path and closed loop specifically for electric current to flow. 
Electron	A very tiny particle.	A tiny particle with a negative charge that moves in a wire to produce electricity. 
Device	A useful tool or machine.	A component that uses electricity to do a specific job.

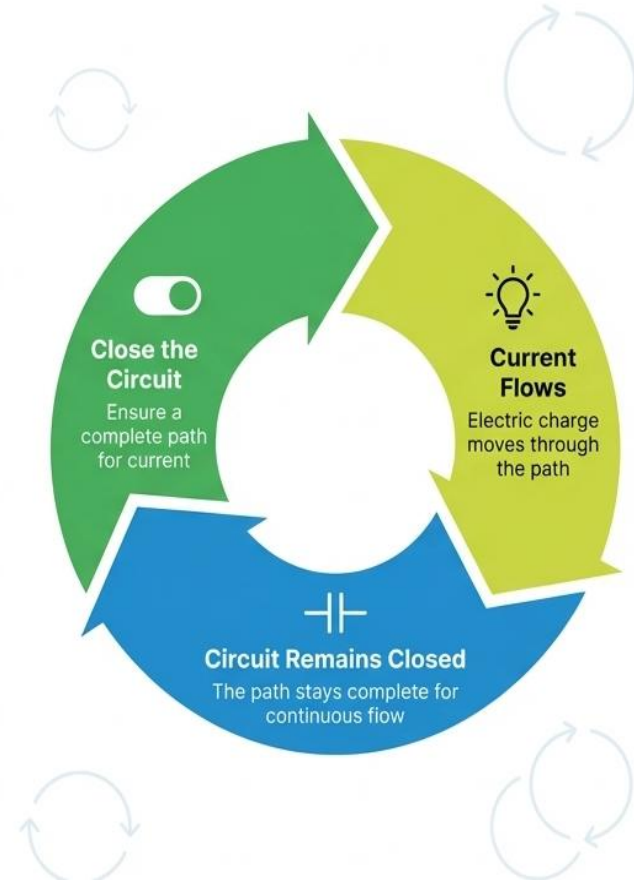
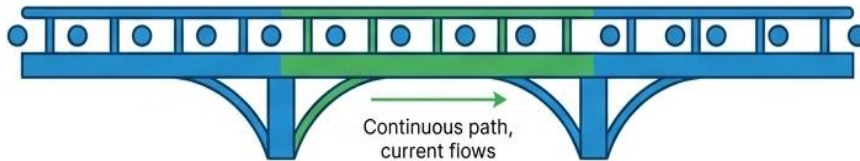
The Golden Rule of Electricity: Path Continuity

For current to flow, the circuit must remain completely closed.

Broken Path



Complete Path





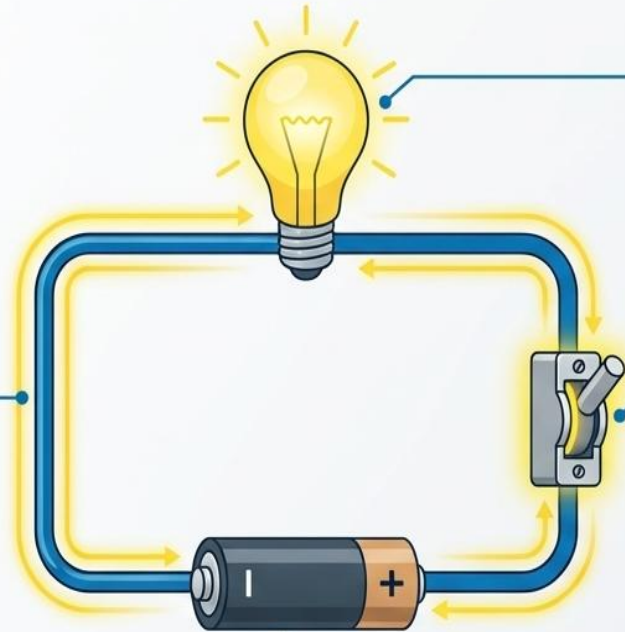
The Anatomy of an Electric Circuit

Conductor

A material, like copper, that allows electric charges to flow easily.

Source of Energy

Provides electrical potential to drive the current.



Load

A component that consumes electrical energy and converts it into another form, such as light.

Switch

A device that opens or closes the circuit to control the flow of current.

Component Deep Dive: Energy and Pathways

Source of Energy

Provides the electrical power for the circuit.

Examples: Battery (DC), AC supply, or Generator.



Conductor

A material that allows electricity to flow easily, providing the physical path for the current.

Examples: Copper wires.



Component Deep Dive: Action and Control

The Load

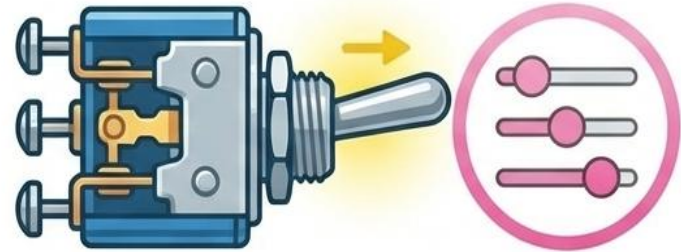
A device that consumes or uses electrical energy to perform work.

Examples: Light bulb, resistor, motor.

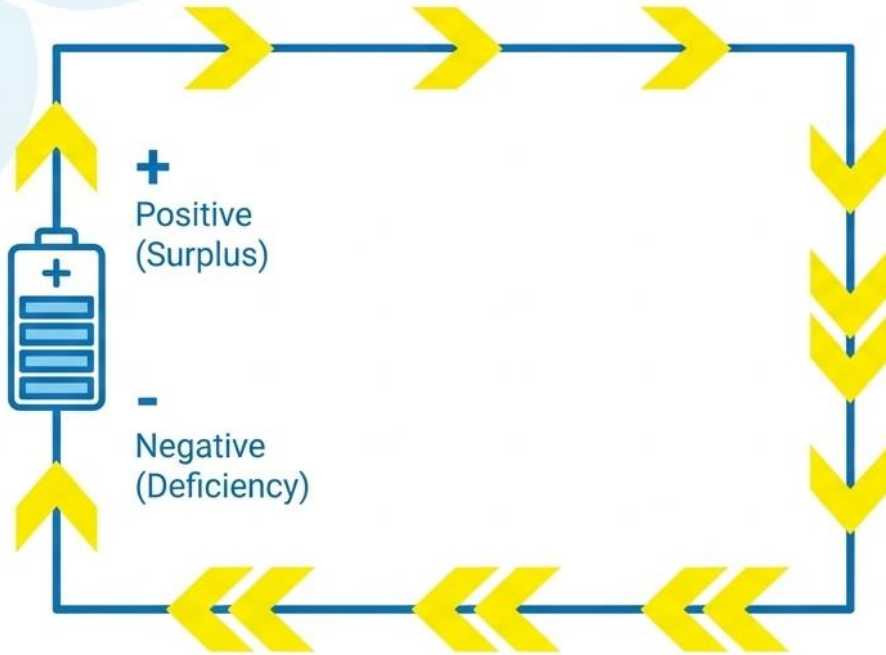


The Switch

Controls the flow of electricity by physically opening or closing the circuit path.



The Dynamics of Movement: Conventional Flow



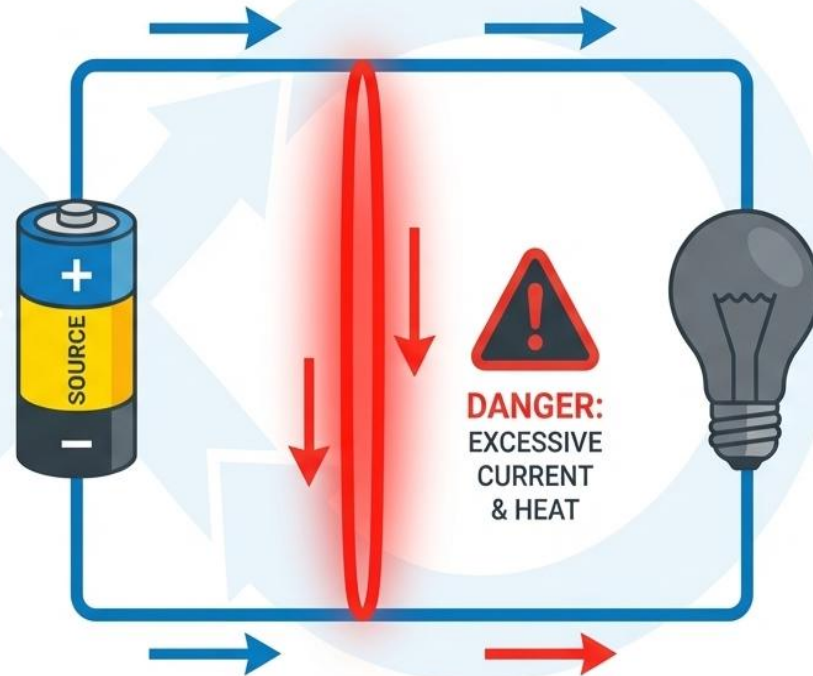
Electric charge moves from the positive (surplus) side of the battery to the negative (deficiency) side.











The Anatomy of a Short Circuit

A short circuit occurs when current finds a state of **low resistance**, bypassing the intended load and resulting in excessive, often **dangerous**, current flow.

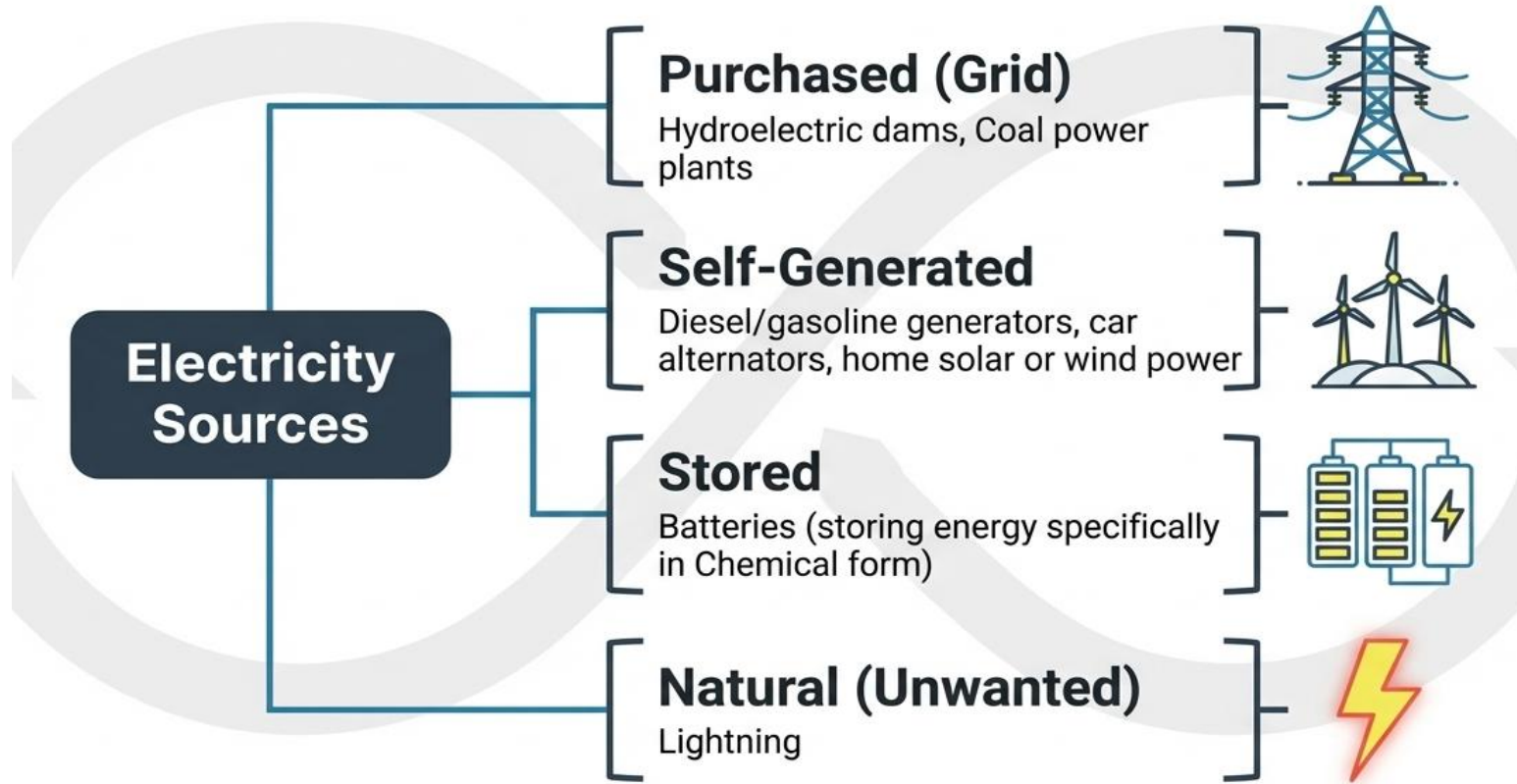




Circuit States Diagnostic Table

	 Closed Circuit Go Green	 Open Circuit Inter Bold	 Short Circuit Alert Red
			
Path Continuity	Complete / Unbroken	Broken path	Bypassed path / Low resistance
Current Flow	Normal flow	Zero flow	Excessive flow
Result	System operates successfully	System is off	Component bypass, potential danger

Origins of Energy: The Macro View



Foundations Review

Generation

Which is a Renewable Source of Electricity?

Diesel Generator

Coal Power Plant

Solar Power

Petrol Engine

Storage

In what form does a Battery store energy?

Electrical Form

Mechanical Form

Chemical Form

Thermal Form

Essentials of Electric Circuits: Elements & Quantities

The Three Passive Elements

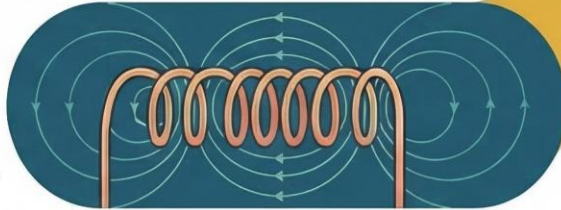
Resistors (R): Opposing Flow

Measured in **Ohms (Ω)**.
Dissipates energy as heat;
defined by **Ohm's Law**.



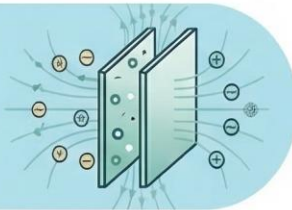
Inductors (L): Magnetic Storage

Measured in **Henrys (H)**.
Opposes changes in current;
stores energy in magnetic fields.

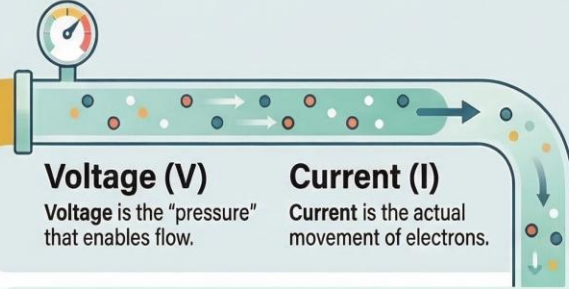


Capacitors (C): Electric Charge

Measured in **Farads (F)**.
Stores energy in electric fields
for smoothing and timing.



Fundamental DC Quantities



Voltage (V)

Voltage is the "pressure"
that enables flow.

Current (I)

Current is the actual
movement of electrons.



Power (P): The Rate of Work

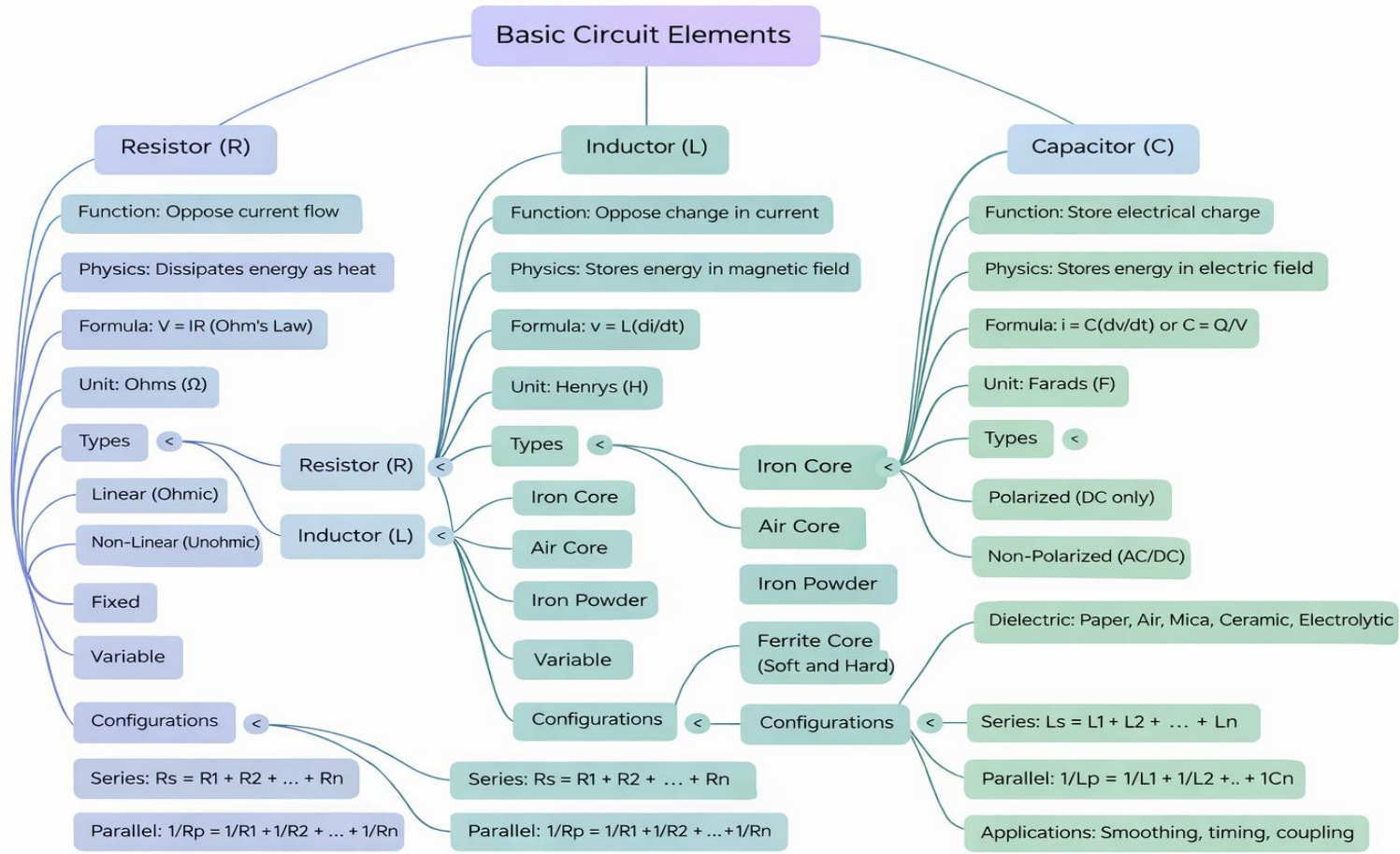
Measured in **Watts (W)**,
calculated by multiplying
Voltage and Current.

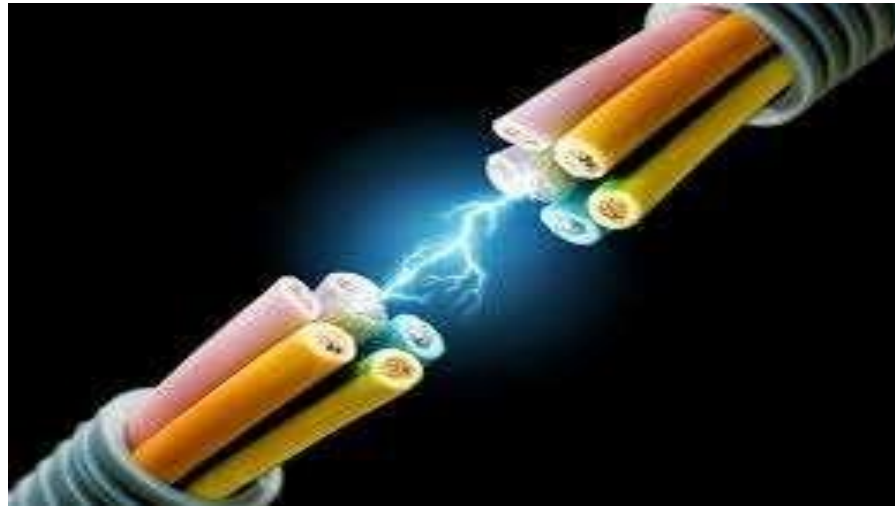


Energy (E): Storable Capacity

Unlike instantaneous power,
energy represents the **total
capacity** to perform work
over time.

Basic Circuit Elements Mind Map





...THANK YOU