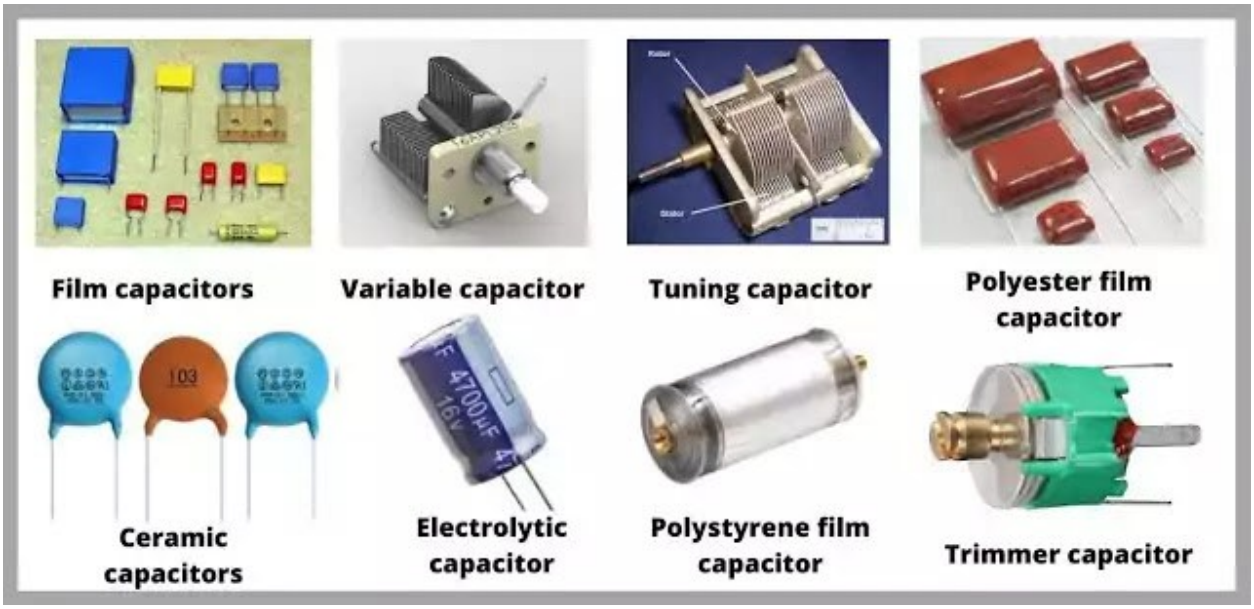
Capacitor

A capacitor is a passive electronic component that stores electrical energy in an electric field. It acts like a temporary battery in a circuit.

Working Principle:
When voltage is applied, charges accumulate on the plates of the capacitor, separated by a dielectric material. When the circuit demands, the capacitor releases this stored energy.

Types:
- Ceramic Capacitor
- Electrolytic Capacitor
- Tantalum Capacitor
- Film Capacitor
- Supercapacitor



Applications:
- Power supply filtering
- Energy storage
- Signal coupling and decoupling
- Oscillators and timers
- Motor starters

Advantages:
- Fast charge/discharge cycle
- No moving parts (reliable)
- Available in a wide range of values

Disadvantages:
- Limited energy storage compared to batteries
- Polarity-sensitive (for electrolytic types)
- Can degrade over time