

Basic Electrical Engineering (TEE 101)

Lecture 48: *Introduction* to *Electrical Machines*

Content

This lecture covers:

**Introduction to Electrical
Machines**

Types of Electrical Machines

**Working Principle of Electrical
Machines**

Introduction

The machines which are operated in relation with electrical energy are called **electric machines** or **electrical machines**.

In **electrical machines**, either input or output or both can be electricity.

The electric machines are of three main types:

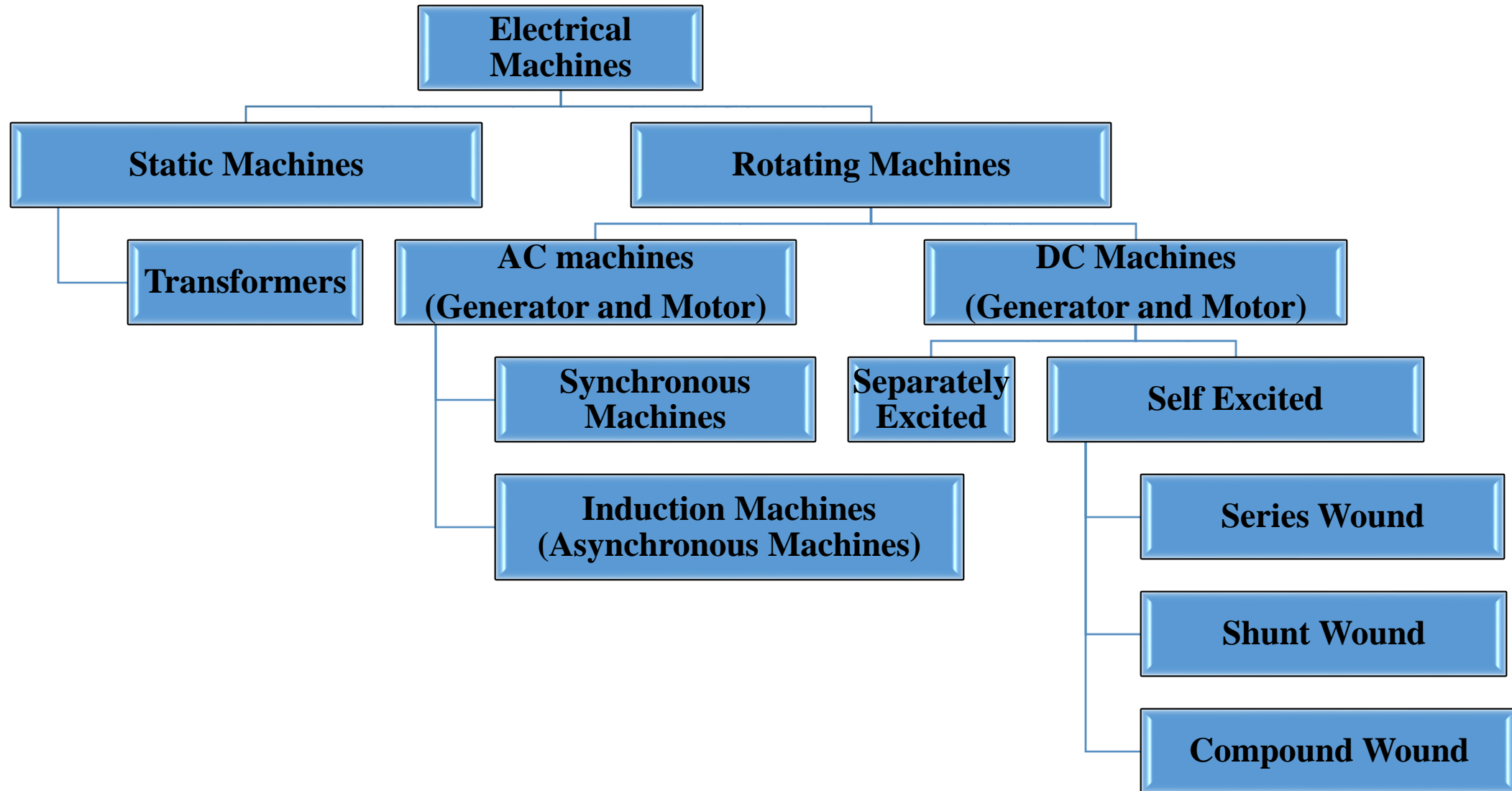
Transformer

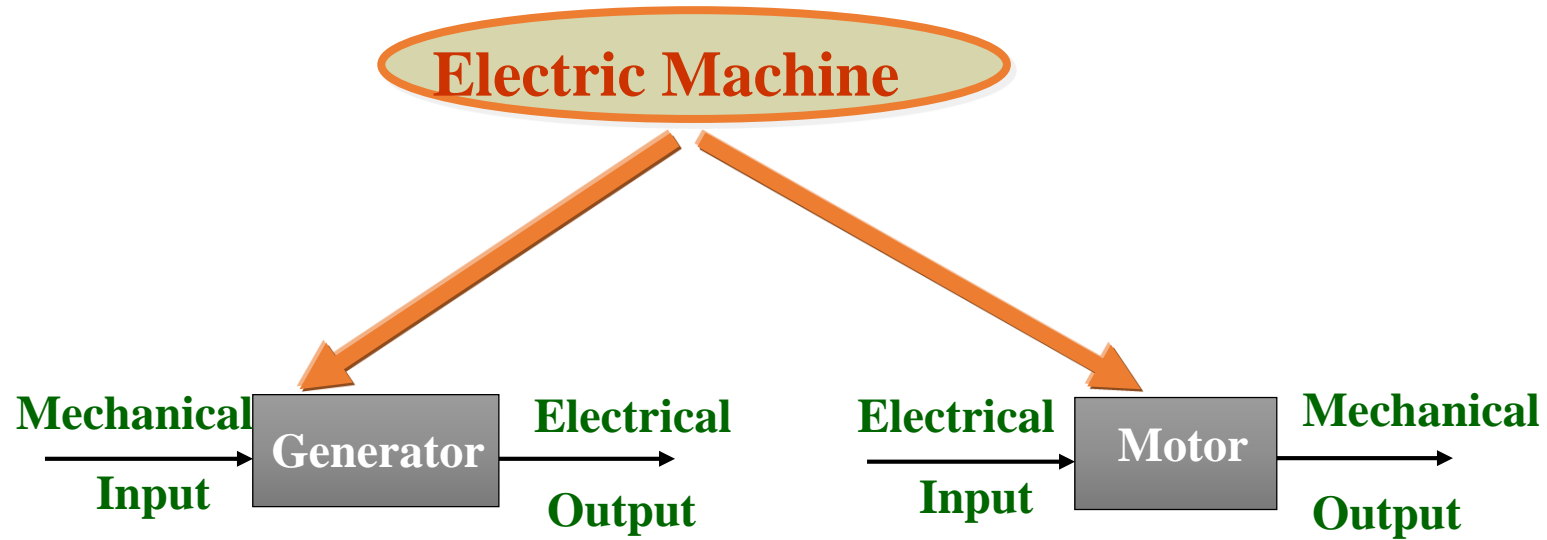
generator,

motor.

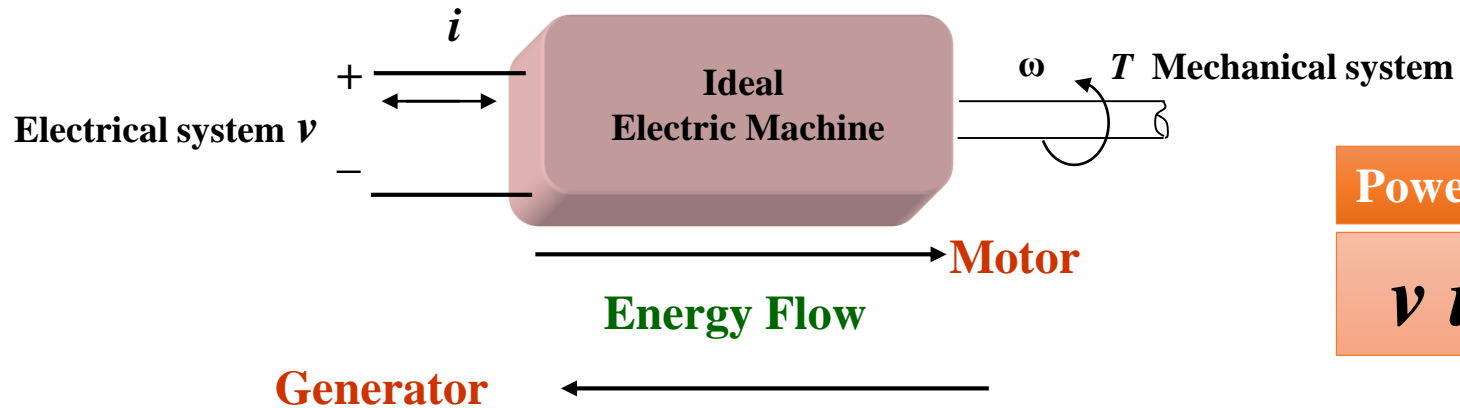


Types of Electrical Machines





Electromechanical Energy Conversion



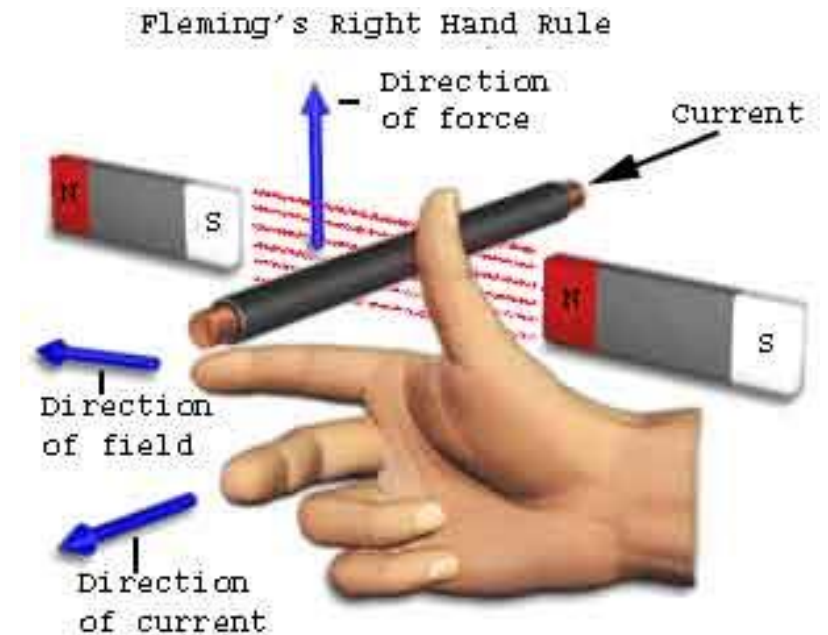
Power Relation

$$v i = T \omega$$

Working Principle of Electrical Generators

Electric Generator:

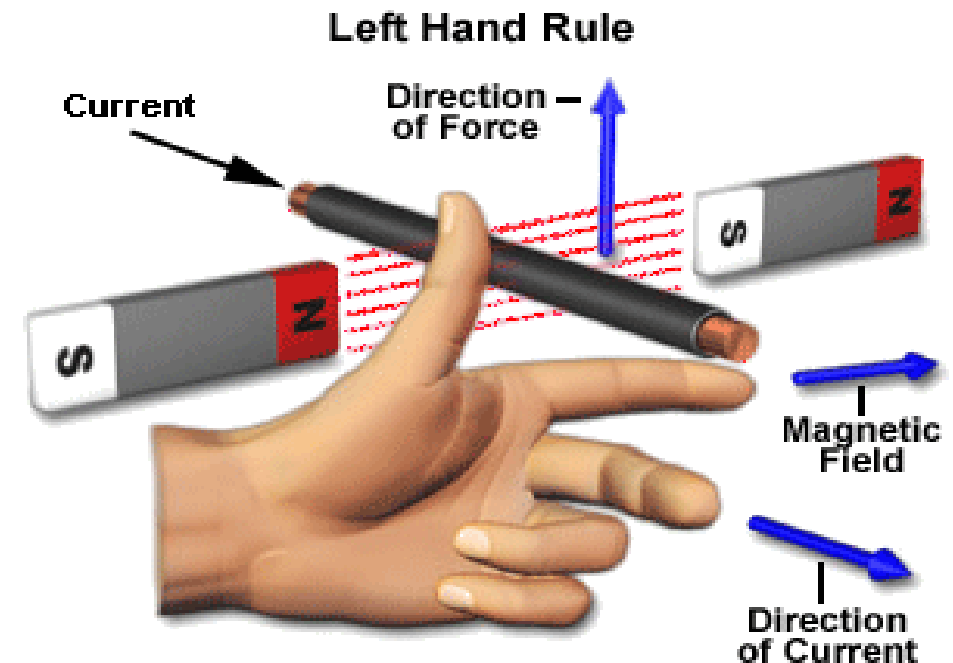
- An **electric generator** is an electrical machine which converts mechanical energy into electrical energy.
- A generator works on the principle of electromagnetic induction.
- It states that whenever a conductor moves in a magnetic field, an emf gets induced within the conductor. This phenomenon is called as generator action.
- The Direction of induced EMF can be determined by using Fleming's Right hand Rule



Working Principle of Electrical Motors

Electric Motor:

- A motor is an electrical machine which converts electrical energy into mechanical energy.
- When a current carrying conductor is placed in a magnetic field, the conductor experiences a mechanical force and this is the principle behind motoring action.
- The Direction of mechanical force can be determined by using Fleming's Left hand Rule



Types of Electrical Machines

AC Machine

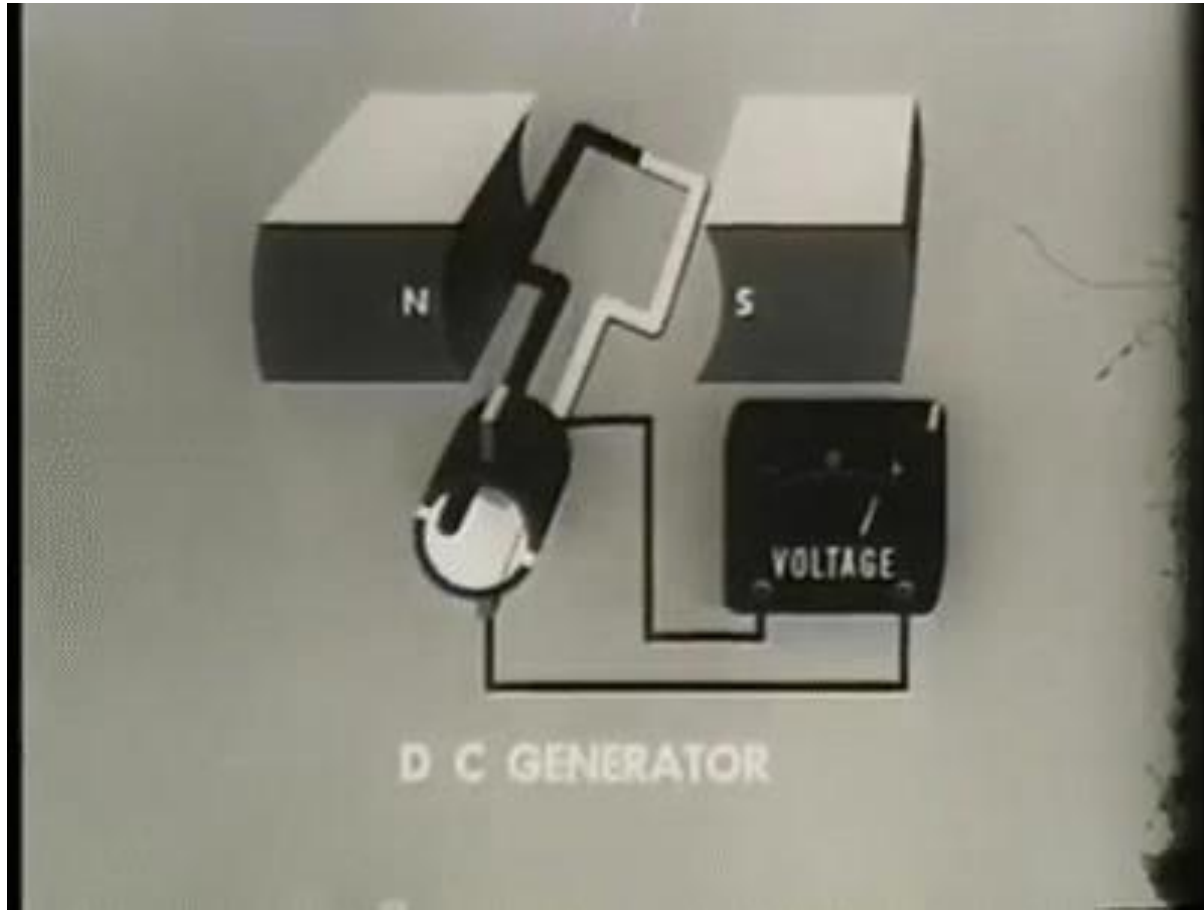
AC Generator: It converts Mechanical Energy into bi-directional (AC) Electricity

AC Motor: It works on AC Supply and converts the same into Mechanical Energy

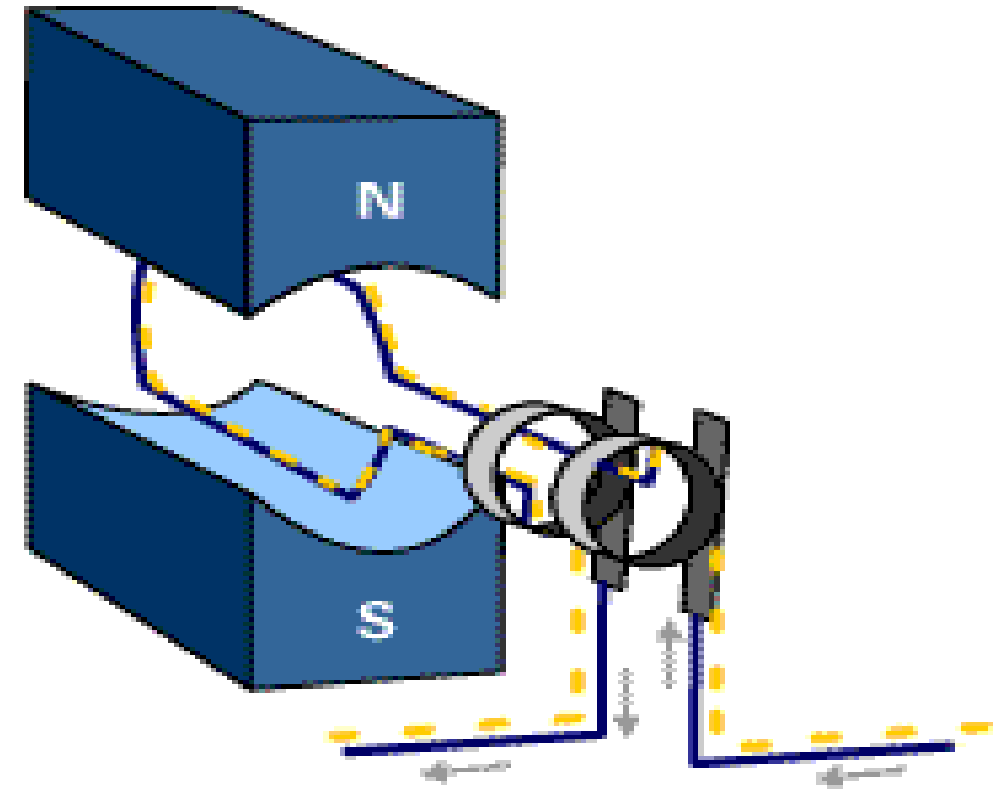
DC Machine

DC Generator: It converts Mechanical Energy into Uni-directional (DC) Electricity

DC Motor: It works on DC Supply and converts the same into Mechanical Energy



DC Generator



AC Generator

Thank You