Lecture #1

# **Electric Machinery II**

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## References

1. Electric Machinery

A. E. Fitzgerald, Charles Kingsley, Jr And Stephen D. Umans, Mc GrawHill, 7th Edition

2. Electric Machinery Fundamentals

Stephen J. Chapman, Mc GrawHill, 5th Edition

Machine: Any mechanical or electrical device that transmits or modifies energy to perform or assist in the performance of human tasks.

Electrical Machinery: Any machine that at least one of its terminals excited by electrical energy.

Common Electrical Machinery: -

Transformers.

Generators.

\_ Motors.



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#### **Electrical Machine II Syllabus**

- 1. Introduction
  - Iranian Power System Network
- 2. Introduction to Rotating Machines
  - Voltage Generation in Electrical Machinery
    - AC MachinesDC Machines
  - Force and Torque in Electrical Machines
    - Electromechanical Energy-Conversion Principles
    - Determination of Magnetic Torques Through Magnetic Field View Point
    - Torque Production Condition
    - $\circ~$  Stator Magnetic Field in DC and AC Machines

### **Electrical Machine II Syllabus**

Lecture #1

- 3. DC Machines
  - Commutator Action
  - Analytical Fundamentals
  - Electric-Circuit Aspects
  - Effect of Armature MMF (Armature reaction, Commutation and Interpoles and Compensating Windings )
  - Steady-State DC Machine Performance
  - Permanent-Magnet DC Machines
  - Series Universal Motors
  - DC Motor Starting
- 4. Induction Machines
  - Introduction to Polyphase Induction Machines
  - Currents and Fluxes in Polyphase Induction Machines
  - Induction-Motor Equivalent Circuit
  - Analysis of the Equivalent Circuit
  - Torque and Power by Use of Thevenin's Theorem
  - Parameter Determination from No-Load and Blocked-Rotor Tests
  - Effects of Rotor Resistance; Wound and Double-Squirrel-Cage Rotors

## Prerequisite and Grading

### Prerequisite

English Knowledge, Primary Mathematics, Machine I

Grading

- Pop quizzes (15% / 3points or 1.5 points).
- Assignments (10% by your TA / 2 points).
- Make-up Exam (if class time permits, 50% of quizzes/ 1.5 points)
- Midterm (25% around 10<sup>th</sup> week / 5 points).
- Final (50% scheduled by office of registrar / 10 points).
- Extra credit with Strict and Fair Assessments (10% additional to your grade / 2 extra points)

# A Prototype Power System Network (Focus on Iranian power system)





## Nominal Capacity of Power Plant Units in Iran by Type and in Megawatts in the Year 1401



11 Dr. Ali Karimpour July 2024 Electricity Sales by Tariff in Iran for the Year 2021 (million kilowatt-hours)

