EE321
Electromechanical Energy Conversion (3-2)
SYLLABUS
2023-24 Fall Semester

Instructor: Prof. Dr. İres İSKENDER
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Text:

1- **Electric Machinery Fundamentals**, Stephen J. Chapman, McGraw Hill, 5th Edition, 2012. **(Main Text)**
2- **Electric Machinery and Power System Fundamentals**, Stephen J. Chapman, McGraw Hill, International Edition, 2002.
3- **Electric Machinery**, Fitzgerald, Kingsley & Umans, 6th Ed., Mc Graw Hill.

Course Outline:

1. **Magnetic Circuits and Magnetic Materials**: Magnetic Circuits; Flux Linkage, Inductance and Energy; Magnetic Materials and Losses, AC Excitation.

2. **Transformers**: Ideal Transformer; Equivalent Circuit; Regulation and Efficiency; Short-Circuit and Open-Circuit Tests; Multi-winding Transformers, Autotransformer.

3. **DC Machines**: Introduction; Commutation Action; Electric Circuit Aspects; Motor operation, Regenerative Braking, Speed Control.

4. **Operational Features of AC Machines**: MMF of Distributed Windings; Pulsating and Rotating Magnetic Fields; EMF Equation.

5. **Induction Machines**: Introduction to Three-Phase Induction Machine Currents and Fluxes; Induction Motor Equivalent Circuit; Determining Machine Parameters, Analysis of Equivalent Circuit; Torque, Power; No-Load and Blocked-Rotor Tests. Motor and Generator Operations, Regenerative Braking.

6. **Synchronous Machines**: Cylindrical Rotor Synchronous Machines, Equivalent Circuit; Open and Short Circuit Characteristics; Steady State Power-Angle and Steady-State Operating Characteristics.

Grading Policy:

Lab	20%	
Midterm	35 %	15/12/2023
Final	45 %	