**EE321**  
**Electromechanical Energy Conversion** (3-2)   
**SYLLABUS**   
2020-21 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 30 %

Final 50 %

Homework (with solution)