

## **ECE 3414 - FUNDAMENTALS OF ENERGY SYSTEMS**

**TEXT BOOK: Zia A. Yamayee, Juan L. Bala “Electromechanical Energy Devices and Power Systems “. First Edition, 1994, John Wiley & Sons, Inc.**

### **TOPICS:**

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**Energy Resources and Power System Components**  
**Basic AC Circuit Concept. Single-Phase AC Circuit**  
**Balanced Three-Phase AC Circuit. Per-Unit Analysis**  
**Magnetic Circuits. Faraday’s Law. Inductance**  
**Transformers: Construction, Equivalent Circuit for Single-Phase Transformer**  
**Transformers: Voltage Regulation, Efficiency**  
**Transformers: Determination of Equivalent Circuit Parameters**  
**Transformers: Autotransformers**  
**Transformers: Three-Phase Transformers**  
**DC-Mach: Basic Principles of Operation, Types**  
**DC-Mach: DC Generator Performance**  
**DC-Mach: DC Motor Performance**  
**Syn-Mach: Equivalent Circuit**  
**Syn-Mach: Open-Circuit and Short-Circuit Characteristics.**  
**Syn-Mach: Power-Angle Characteristics**  
**Syn-Mach: Generators Synchronization,**  
**Syn-Mach: Motor Performance, V-curves**  
**Ind-Mach: Construction, Slip**  
**Ind-Mach: Equivalent Circuit of a Three-Phase Ind. Motor**  
**Ind-Mach: Determination of Parameters from Tests**  
**Ind-Mach: Torque-Speed Characteristics**  
**Single-Phase Induction Motors: Equivalent Circuit, Performance**  
**Single-Phase Induction Motors: Starting Condition**