

EE 360 Electric Energy Engineering

Textbook: **Electromechanical Energy Devices and Power Systems**, by Zia A. Yamayee, Juan L. Bala. Jr., 1994.

Breakdown of Course Content Indicating Number of Lectures

1. **Three Phase Circuits: (4 Lectures, text sections 3.3,3.4)**
Phasor diagram,Balanced 3-phase circuits,Delta and Wye connections, Power measurements.
2. **Magnetic Circuits: (4 Lectures, sections 4.1-4.4 +notes)**
Magnetic Circuit –definitions, Magnetic Circuit Computations, Magnetization curves of ferromagnetic materials, Series and Parallel Circuits, Hysteresis and Eddy-current losses in ferromagnetic materials.
3. **Transformers: (9 Lectures, sections 4.5.1-4.5.6)**
Introduction and construction, Theory of operation,Equivalent circuit, Parameters from No-Load and Short Circuit Tests, Voltage regulation and efficiency, Auto-transformers and parallel operation of transformers, Three Phase transformers connections and equivalent circuit.
4. **DC Machines: (9 Lectures, sections 6.1-6.7)**
Introduction and construction, Generation of unidirectional voltages, Voltage and Torque equations, and energy losses, Equivalent circuit of DC generator, and DC generator types, Voltage-current characteristic and terminal voltage control, Equivalent circuit of DC motor, and DC motor types, Speed-Torque Characteristics and Speed Control (field and armature control).
5. **3-Phase Synchronous Machines: (7 Lectures, sections 7.1, 7.2, 7.6)**
Introduction and Construction, Generation of a 3-phase voltage and Voltage equation, Linear Analysis, equivalent circuit and Voltage Regulation, Power of Cylindrical-Rotor Machine, Parallel operation of synchronous generators. Synchronous motor, Phasor diagram, equivalent circuit and power factor control.
6. **3-Phase Induction Motor: (7 Lectures, sections 8.1-8.4)**
Introduction and Construction, Revolving Magnetic Field (skip mathematical analysis), IM as a transformer, Equivalent Circuit, Equivalent Circuit Parameters from Tests, Computation of IM Performance, Torque-Speed Characteristic, Starting Torque and Maximum Developed Torque.
7. **Transmission Line: (5 Lectures, sections 9.1-9.5)**
Transmission line parameters, Transmission line representation, ABCD parameters,Voltage regulation and efficiency.