



AL IMAM MOHAMMAD IBN SAUD ISLAMIC UNIVERSITY
COLLEGE OF ENGINEERING
Department of Electrical Engineering

Course Information	
Course Code and Name:	EE 371: Electric Drives
Credit Hours:	3 (3 Lecture + 1 Tutorial)
Prerequisites:	EE222 Electrical Circuit Analysis & EE 271 Electromagnetics

Course Description
Transformers: performance characteristics, three phase connections, autotransformers, DC machines: performance equations, generator and motor characteristics, starting and speed control of motors. Synchronous machines: generator and motor operation. Three phase induction motors: operation, performance calculations, starting and speed control. Single phase induction motors. Small synchronous motors. Universal motors.

Textbook			
Title	Electromechanical Energy Devices and Power Systems		
Authors	Zia A. Yamayee & Juan L. Bala. Jr		
Publisher	John Wiley & Sons, Inc	Year and Edition	

Course Contents
AC circuit concepts: Single phase AC circuits, Balanced 3 phase circuits, Delta and Wye connections, 3 phase power measurements.
Magnetic circuits: Introduction, Magnetic Circuits Faraday's law, Inductance and magnetic energy.
Transformers: Ideal transformer, Actual transformer. Approximate equivalent circuits, voltage regulation, efficiency. Determination of equivalent circuit (open circuit test & short circuit test) parameters. Polarity, Autotransformer, three phase transformers.
DC Machines: Introduction, Basic principles of operation, generation of unidirectional voltage, types of DC machines. Voltage and torque equations, No load characteristics of DC generator, Voltage buildup in shunt generator, load characteristics, voltage regulation, DC generator efficiency. Speed regulation of DC motor, DC motor efficiency, Speed Torque characteristics of DC motor, motor starting, Applications of DC motors.
Synchronous Machines: Introduction, equivalent circuit of 3-Phase Induction motor, open circuit characteristics, short circuit characteristics, voltage regulation, Power angle characteristics, efficiency, Synchronous motor performance.
Induction Motors: Introduction, equivalent circuit of 3-Phase Induction motor, No load test, DC test, Blocked-Rotor test
Performance analysis of an Induction motor, Starting torque, Torque vs Speed
Single phase Induction motors equivalent circuit and Performance analysis, starting of single phase motors

Academic Coordinator	Signature
Mohamed Yehia Shalaby	<i>Shalaby</i>

Official Stamp

