

Subject	Electrical Device &Appls	Course Code	CT432	Theoretical	3hrs / wk
Semester	7	Prerequisite	CT214	Practical	3hrs / wk

Program Learning Component

Week 1	Review the analysis of AC and DC Electric circuits		
	Specific Learning Outcomes	Resources	Practical
	AC and DC Electric circuits analysis and formulas for calculating the impedance, current, voltage and power and phase shift.	Power point slide, Whiteboard	Power circuits experiments available in the lab
Week 2	Study the function and the types of the Transformers		
	Specific Learning Outcomes	Resources	Practical
	Magnetic circuits and Transformers	Power point slide, Whiteboard	Experiments on magnetic circuits and Transformers
Week 3-4	Study the DC motors parts, operation and types		
	Specific Learning Outcomes	Resources	Practical
	Principles of operation of the DC motor Shunt motor, series motor and compound motor Torque versus speed characteristic for the DC motor	Power point slide, Whiteboard	Self excited and separately excited shunt, series and compound DC motor Electronic devices used for driving the DC motor
Week 5-6	Study the Driving techniques for the DC motor in control applications		
	Specific Learning Outcomes	Resources	Practical
	Drive and Control of the DC motors speed and rotation Chopper controlled of DC motor drives Theory of PWM technique used to control the motor speed	Power point slide, Whiteboard	H-bridge for driving the DC motor to control the speed and the direction of rotation Implementation of PWM technique used to control the motor speed

	Dc motor operation on Ac power supply Thyristor speed controller for DC motors.		Experiments applied to the Dc motor operation on Ac power supply Thyristor speed controller for DC motors
Week 7-8	Study the Universal Motor operation using AC and DC power supply		
	Specific Learning Outcomes	Resources	Practical
	Principles of operation for the Universal Motor using AC and DC power supply Direction of rotation of the universal motor Effect of the compensating winding for the universal motor Torque versus speed characteristic of an AC powered universal motor	Power point slide, Whiteboard	Experiments applied to the Universal Motor using AC and DC power supply Direction of rotation of the universal motor Effect of the compensating winding for the universal motor Torque versus speed characteristic of an AC powered universal motor
Week 9	Study the operation and the use of DC generator		
	Specific Learning Outcomes	Resources	Practical
	Separately excited shunt ,series and compound DC generator output voltage V versus speed characteristic Output voltage versus field current Voltage versus current characteristic	Power point slide, Whiteboard	Experiments applied to the Separately excited shunt ,series and compound DC generator output voltage V versus speed characteristic Output voltage versus field current Voltage versus current characteristic
Week 10-11	Study the AC motors operation and types		
	Specific Learning Outcomes	Resources	Practical
	Theory of operation for the AC Induction motors	Power point slide, Whiteboard	Experiments available in lab about

	<p>Types of the AC induction motors. Induction motor (construction ,starting and speed versus torque curves). Three phase induction motor squirrel cage torque versus speed characteristic Torque and load characteristics of an induction motor Direction of Rotation and change in direction of squirrel cage induction motor. Comparison between the operation of different types of the single phase AC motors</p>		<p>Single phase induction Motor. Three phase induction motor.</p>
Study the techniques used for the AC motors in control applications			
Week 12	Specific Learning Outcomes	Resources	Practical
	<p>Introduction to Ac Induction motor speed control techniques Describing the operation of the IGBT Inverter for the DC to AC converter . Description of Vector control drive converter Motor speed versus the mechanical load variations under vector drive operation. effect of varying the frequency on the output current waveforms</p>	<p>Power point slide, Whiteboard</p>	<p>Experiments on lab about different types on induction motor speed control.</p>
Study the synchronous motors operation and application			
Week 13	Specific Learning Outcomes	Resources	Practical
	<p>Introducing the principles of operation of the synchronous motors The relation between the reactive power versus the field current for the three phase synchronous motor under no load operation. The relation between the line current</p>	<p>Power point slide, Whiteboard</p>	<p>Starting of the synchronous motor Measuring the Synchronous motor pull-out torque Relationship between the pull-out torque and the field current</p>

	versus the field current for the three phase synchronous motor operating without load.		
Week 14	Study the synchronous generators operation and application		
	Specific Learning Outcomes	Resources	Practical
	Introducing the synchronous generators No load operation of synchronous generators (effect of speed on amplitude and frequency of the generated voltage) Voltage regulation characteristics (use of field current as a regulator mechanism).	Power point slide, Whiteboard	Frequency and voltage regulation of synchronous generator Effect of the load on the output voltage and the frequency Generator synchronization