



Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous Institute Affiliated to University of Mumbai)

Course Code	Course Name	Teaching Scheme (Hrs/week)			Credits Assigned			
		L	T	P	L	T	P	Total
ES21	Basic Electrical Technology	3	-	--	3	--	--	3
		Examination Scheme						
		ISE		MSE		ESE		
		10		30		100 (60% Weightage)		

Pre-requisite Course Codes		
Course Outcomes	CO1	Compute various electrical quantities of given dc circuit using circuit simplification techniques and various network theorems.
	CO2	Describe the concept of ac circuit and its resonance phenomena for a given RL, RC and RLC circuit.
	CO3	Analyze the series and parallel magnetic circuit.
	CO4	Describe characteristics of single phase, three phase ac circuits and transformer equivalent circuit theoretically and graphically
	CO5	Describe the constructional details and working principle of given AC and DC machines

Module No.	Unit No.	Topics	Ref.	Hrs.
Prerequisite	A	Concept of e.m.f, potential difference, current, ohm's law, resistance, resistivity, series and parallel connections, power dissipation in resistance, effect of temperature on resistance		02
	B	Capacitors, with uniform and composite medium, energy stored in capacitor, R-C time constant.		
	C	Magnetic field, Faraday's laws of Electromagnetic induction, Hysteresis and eddy current losses, energy stored in an inductor, time constant in R-L circuit		
1	1.1	Kirchhoff's laws, Ideal and practical voltage and current source, Source transformation, Star-delta transformation	1,2	04
	1.2	Mesh and Nodal analysis, super node and super mesh	1,2	02
	1.3	Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem	1,2	06
2	2.1	Basic definitions to understand concepts in magnetic circuit, ohm's law in a magnetic circuit, parallel magnetic circuit, coefficient of coupling, dot convention,	3	03
	2.2	Electrically joined coupled coils: Series adding, Series opposing, parallel adding, parallel opposing, comparison between magnetic and electrical circuit	3	02
3	3.1	Generation of alternating voltage and currents, RMS and Average	1,2	03



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		value, form factor , crest factor, AC through resistance, inductance and capacitance		
	3.2	R-L , R-C and R-L-C series and parallel circuits, power and power factor	1,2	03
	3.3	Series and parallel resonance, Q-factor and bandwidth	1,2	04
4	4.1	Three phase voltage and current generation, Star and delta connections, relationship between phase and line currents and voltages	1	01
	4.2	Power in three phase circuit, two wattmeter method	1	02
5	5.1	Single phase transformer : Construction, working principle, EMF equation, Phasor diagram with resistive, inductive and capacitive load	1,4	03
	5.2	DC machine: Construction, working principle, emf equation, Characteristic, applications	1,4	02
	5.3	Three phase induction motor: Construction, working principle, applications, equivalent circuit of three phase induction motor	1,4	03
	5.4	Single phase induction motor: Construction, working principle, double field revolving theory, split phase, capacitor start and shaded pole motor.	1,4	02
			Total	42

References:

- [1] B.L.Theraja "Electrical Technology" Vol-I and II, S. Chand Publications, 23rd ed. 2003.
- [2] Joseph A Edminister, "Schaum's outline of theory and problems of electric circuits" Tata McGraw Hill, 2nd edition
- [3] S.Sivanagaraju, G. Kishor, C. Srinivasa Rao, " Electrical Circuit Analysis" CENGAGE Learning
- [4] D P Kothari and I J Nagrath "Electrical Machines", McGraw Hill, Fourth edition