



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
ES11	Basic Electrical and Electronics Engineering	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	Compare Diode, BJT, FET on the basis of their operation and applications.
	CO4	Implement applications using OPAMP and timer circuit.

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		DC circuit		
	1.1	Kirchhoff's laws, Ideal and practical voltage and current source, Source transformation, Star-delta transformation	1,2	03
	1.2	Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem	1,2	03
2		AC circuit		
	2.1	Generation of alternating voltage and currents, RMS and Average value, form factor, crest factor, AC through resistance, inductance and capacitance	2,3	03
	2.2	R-L, R-C and R-L-C series and parallel circuits, power and power factor	2,3	04
	2.3	Series and parallel resonance, Q-factor and bandwidth	2,3	03



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3		Diode, BJT and applications		
	3.1	Half wave, Full wave and Bridge rectifier circuit, Filter circuit, Zener as a regulator, Clipper and clamper circuit using diode	4	03
	3.2	BJT operation, CE, CB and CC configuration of BJT, BJT as a switch, BJT as a current amplifier and voltage amplifier, Testing of BJT using digital multimeter,	4	03
4		FET operation and applications		
	4.1	FET operation, Configuration of FET, Common source FET amplifier, Comparison between BJT and FET, advantages of negative feedback in CE and CS amplifier,	4	03
	4.2	Barkhausen stability criterion in oscillator, RC phase shift oscillator, Hartley and colpitts oscillator, Crystal oscillator	4	03
5		Operational amplifier		
	5.1	Operational amplifier, block diagram representation, IDEAL opamp characteristics, open loop configuration	5	02
	5.2	Opamp applications: Opamp as an inverting and noninverting amplifier, opamp as a adder, subtractor, precision rectifier,	5	03
	5.3	Introduction of IC555 timer, Internal block diagram of IC555, Astable, monostable and bistable mode using IC555	5	03
			Total	39

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] David Bell, "Electronic Devices and Circuits" Fifth Edition, Oxford University Press
- [5] Ramakant A. Gayakwad, "OPAMP and Linear ICs", 4th Edition, Prentice Hall / Pearson Education, 2001.