SRM UNIVERSITY
FACULTY OF ENGINEERING AND TECHNOLOGY
SCHOOL OF ELECTRONICS AND ELECTRICAL ENGINEERING
DEPARTMENT OF EEE

Course Code : EE0203
Course Title : Electric Circuit Analysis
Semester : III
Course Time : July-Nov 2013
Location : ESB BLOCK

Course timings:

Day	Section									
	A		B		C		D		E	
	HR	TIMING	HR	TIMING	HR	TIMING	HR	TIMING	HR	TIMING
Day 1			5	1.30 – 2.20	7	2.20 – 3.10	7	2.20 – 3.10	4, 6	11.25 – 12.15 2.20 – 3.10
Day2	1	8.45 -9.35			4,5	11.25 – 12.15 1.30 – 2.20	5	1.30 – 2.20		
Day3	2	9.35 - 10.25	1	8.45 – 9.35			1	8.45 – 9.35		
Day4			3, 5	10.35 – 11.25 1.30 – 2.20	2	9.35 – 10.25	3	10.35 – 11.25	1, 4	8.45 – 9.35 11.25 – 12.15
Day5	3, 6	10.35-11.25 2.20 – 3.10								

Faculty Details:

Sec.	Name of the Staff	Office	Office hour	Mail id
A	Mr.D. Sattianadan	ESB310	12.30 -1.30PM	sattianandan.d@ktr.srmuniv.ac.in
B	Ms.Uthra.R	ESB219	12.30 -1.30PM	uthra.r@ktr.srmuniv.ac.in
C	Ms.Subbuchitrakala	ESB207	12.30-1.30 PM	subbuchithirakala.v@ktr.srmuniv.ac.in
D	Ms.A.Geetha	|ESB302	12.30-1.30 PM	geetha.a@ktr.srmuniv.ac.in
E	Mr.K.Saravanan	ESB201	12.30-1.30 PM	saravanan..k@ktr.srmuniv.ac.in

Required Text Books:

TEXT BOOKS

1. Edminister J.A., *Theory and Problems of Electric Circuits*, Schaum's Outline Series, McGraw Hill Book Company, 5th Edition, 1994
2. Sudhakar, A. and Shyam Mohan S.P, *circuits and Networks Analysis and Synthesis*, Tata McGraw Hill Publishing Compamy Ltd., New Delhi, 1994.

REFERENCE BOOKS

1. Muthusubramanian R and Iyyappan K, *Circuit Theor*, Anuradha Publishing Private Ltd., Tamil Nadu, 1999.
2. Arumugam and Prem Kumar, *Electric Circuit Theory*, Khanna Publishers, 2002.
3. Hayt & Kemmerley, *Engineering Circuit Analysis*, Tata McGraw Hill, 1993.
4. Soni and Gupta, *A Course in Electric Circuit Analysis*, Dhanpat Rai and Co., 1981.
5. T.Nageswara Rao, *Electric Circuit Analysis*, A.R Publications, sirkali ,Tamil Nadu-2009

Web Resources :

- www.allabout**circuits**.com
- www.circuit-magic.com

Prerequisite : Nil

INSTRUCTIONAL OBJECTIVES:

After the completion of this course successfully the students will be able to:

At the end of the course the students will be able to:

1. Understand about the network elements, types of networks, network topology
2. Analysis complex circuits using Mesh current & Nodal voltage method **&** Gain knowledge about the solution methods of AC and DC circuits.
3. Get an insight into solution of RLC circuits, single phase and three phase power measurements, analysis of coupled circuits.
4. Understand the concept of two port network.
5. Understand the fundamentals of filters.
6. Gain knowledge about synthesis of RL,RC & RLC networks.

Assessment Details

Cycle Test – I	:	10 Marks
Surprise Test	:	05 Marks
Cycle Test – II	:	10 Marks
Model Exam	:	20 Marks
Attendance	:	05 Marks
Total	:	50 Marks

Detailed Session Plan

BASICS OF CIRCUITS,NETWORK TOPOLOGY AND TRANSIENT ANALYSIS

Ideal sources – Dependent and Independent sources – Linear relation between voltage and current of Network elements – source Transformation – Types of Networks – Network reduction – voltage division – current division – Star – delta transformation – concept of duality – Dual networks – Free & forced responses of RL, RC, RLC circuits with DC and sinusoidal excitation**.**

Session No.	Topics to be covered	Text book	Chap. no & Page No.	Instructional Objective	Program Outcome
1	Types of Electrical networks, Types of sources	R5	I.1 to I.5, I.11 to I.14	Understand about the network elements, types of networks, network topology	(a) an ability to apply knowledge of mathematics, science, and engineering
2	Source Transformation, KCL, KVL, Series Parallel circuits		1.1 to 1.69		
3	Network reduction, voltage division, current division rule		1.1 to 1.69		
4	Star – delta transformation		1.69-1.73		
5	concept of duality – Dual networks		12.1 to 12.11		
6	Transient: DC Response of RL, RC, RLC circuit	T2	490-500		
7	Transient: Sinusoidal Response of RL, RC, circuit		500-506		
8	Transient: Sinusoidal Response of RLC circuit		506-511		

NETWORK THEOREMS

Formation of matrix equations and analysis of complex circuits using Mesh current method and nodal method -Thevenin's Theorem- Norton's Theorem- Superposition theorem- Maximum power transfer theorem, substitution theorem, Reciprocity theorem, Millman's theorem, Tellegen's theorem – Statement, illustration & application to AC & DC circuits.

Session No.	Topics to be covered	Text book	Chap.no & Page No.	Instructional Objective	Program Outcome
9	Mesh current method-DC Problems	R5	7.1 to 7.17	Analysis complex circuits using Mesh current & Nodal voltage method **&** Gain knowledge about the solution methods of AC and DC circuits	(a) an ability to apply knowledge of mathematics, science, and engineering (b) an ability to design and conduct experiments, as well as to analyze and interpret data (e) an ability to identify, formulate, and solve engineering problems
10	Mesh current method-AC Problems		7.1 to 7.17		
11	Nodal method- DC Problems		7.17 to 7.37		
12	Nodal method- AC Problems		7.17 to 7.37		
13	Superposition theorem		9.1 to 9.12		
14	Thevenin's Theorem		9.32 to 9.49		
15	Norton's Theorem		9.49 to 9.63		
16	Maximum power transfer theorem		9.63 to 9.65		
17	Substitution theorem, Reciprocity theorem		9.13 to 9.31		
18	Millman's theorem, Tellegen's theorem		9.75 to 9.94		

POWER MEASUREMENTS AND COUPLED CIRCUITS

Single phase power measurement by 3 volt meter and 3 ammeter method – series resonance, parallel resonance – Q factor – Bandwidth. Solution of three phase balanced circuits & unbalanced circuits – Three phase power measurement using 2 wattmeters. Self Inductance – Mutual Inductance – Coefficient of coupling – dot rule – ideal transformer effective inductance of coupled coils in series & in parallel – Analysis of coupled circuits.

Session No.	Topics to be covered	Text book	Chap.no & Page No.	Instructional Objective	Program Outcome
19	Single phase power measurement by 3 volt meter and 3 ammeter method, Three phase power measurement using 2 watt meters	-	Class Notes, 6.30 to 6.33		(a) an ability to apply knowledge of mathematics, science,

20	Series resonance	**R5**	**5.1 to 5.24**	Get an insight into solution of RLC circuits, single phase and three phase power measurements, analysis of coupled circuits	and engineering (b) an ability to design and conduct experiments, as well as to analyze and interpret data (e) an ability to identify, formulate, and solve engineering problems
21	Parallel resonance		**5.24 to 5.47**		
22	Parallel resonance-Problems		**5.24 to 5.47**		
23	Solution of three phase balanced circuits & unbalanced circuits		**6.4 to 6.30**		
24	Self Inductance – Mutual Inductance – Coefficient of coupling		**8.1 to 8.4**		
25	Dot rule		**8.5 to 8.18**		
26	Ideal transformer effective inductance of coupled coils in series & in parallel		**8.5 to 8.18**		
27	Analysis of coupled circuits		**8.5 to 8.18**		

TWO PORT NETWORKS

Open Circuit Impedance (Z) Parameters, short Circuit Admittance (Y) Parameters, Transmission (ABCD) Parameters and Inverse Transmission Parameters, Hybrid (h) Parameters and Inverse Hybrid Parameters, Conversion between parameters, interconnection of two-port networks.

Session No.	Topics to be covered	Text book	Chap.no & Page No.	Instructional Objective	Program Outcome
28	Two port N/W, Open Circuit Impedance (Z) Parameters	**R5**	**13.1 to 13.6**	Understand the concept of two port network.	(a) an ability to apply knowledge of mathematics, science, and engineering (b) an ability to design and conduct experiments, as well as to analyze and interpret data (e) an ability to identify, formulate, and solve engineering problems
29	Open Circuit Impedance (Z) Parameters-Problems		**13.31-13.33**		
30	Short Circuit Admittance (Y) Parameters		**13.4-13.5**		
31	short Circuit Admittance (Y) Parameters-Problems		**13.31-13.33**		
32	Transmission (ABCD) Parameters and Inverse Transmission Parameters		**13.9 to 13.10**		
33	Transmission (ABCD) Parameters and Inverse Transmission Parameters-Problems		**13.31-13.33**		
34	Hybrid (h) Parameters and Inverse Hybrid Parameters		**13.6 to 13.7**		
35	Hybrid (h) Parameters and Inverse Hybrid Parameters - Problems		**13.31-13.33**		
36	Conversion between parameters		**13.10 to 13.16**		
37	Conversion between parameters		**13.10 to 13.16**		
38	Interconnection of two-port networks		**13.52 to 13.55**		

FILTERS, ATTENUATORS AND SYNTHESIS OF NETWORKS

Classification of filters, filter network, characteristic impedance in the pass band and stop band , constant K and m-derived, BPF, BEF, attenuators. Hurwitz polynomials, Positive real function, synthesis of one port networks, synthesis of RL, RC by Foster and Cauer method.

Session No.	Topics to be covered	Text book	Chap.no & Page No.		Instructional Objective	Program Outcome
39	Classification of filters, filter networks	**T2**	**762-770**			(a) an ability to apply

40	Filter Design(LPF,HPF,BPF,BEF)-constant K and m-derived		**770-797**	Understand the fundamentals of filters. Gain knowledge about synthesis of RL,RC & RLC networks.	knowledge of mathematics, science, and engineering (b) an ability to design and conduct experiments, as well as to analyze and interpret data (e) an ability to identify, formulate, and solve engineering problems
41	Attenuators, Design of Attenuators		**798-807**		
42	Hurwitz polynomials		**840842**		
43	Positive real function, synthesis of one port networks		**842-846**		
44	Foster method		**846-867**		
45	Cauer method		**846-867**		

TEXT BOOKS

3. Edminister J.A., *Theory and Problems of Electric Circuits*, Schaum's Outline Series, McGraw Hill Book Company, 5th Edition, 1994
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The Vaisala HUMICAPÂ® HMT310 series is for demanding industrial applications where compact product design is essential. The measurement stability is excellent. The instrument is easy to integrate, small in size and insensitive to dust and most chemicals. The HMT310 series features several probe options for different application needs: HMT311 for wall mounting. HMT313 for general use.