Kadi Sarva Vishwavidyalaya

Faculty of Engineering & Technology
Second Year Bachelor of Engineering (EE) – Semester III
With effect from: Academic Year 2018-19

EE304-N	Electrical Circuit Analysis
Pre-requisite	

Teaching Scheme (Credits and Hours)

Teaching scheme				Total Credit	Evaluation Scheme						Total
					Theory		IE Marks	CIA Marks	Pract. Marks		
L	T	P	Total		Hrs	Marks					
Hrs	Hrs	Hrs	Hrs								
4+1*	00	02	07	05	03	70	30	20	30		150

Course Objective:

- To present a problem oriented introductory knowledge of Electrical Engineering Circuits.

- Realization concept of circuit components, their characteristics and responses

- To solve the networks using various theorems and laws

- To reduce the complex network using network topology
- To realization about the filter circuits.

  Outline of the Course:

Sr. No	Title of the Unit	Minimum Hours
1	**Concepts of Circuits:**	**4**
2	**Basic Network Analysis methods:**	**8**
3	**Network Theorems**	**10**
4	**Initial Conditions**	**08**
5	**Transients in First and Second order linear circuits-RL, RC and RLC**	**6**
6	**Fourier Series and Signal Spectra**	**6**
7	**Resonance and Filters**	**6**
8	**Two Port Parameters**	**6**

9	Network Topology	6
	Total	**60**

Total hours (Theory): 60
Total hours (Lab): 30
Total hours: 90

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DETAILED SYLLABUS

Unit No	Topics	Lectures (Hours)	Weightage
1.	**Concepts of Circuits:** Network classification, Energy sources, V-I relations for R, L and C. Graphical analysis of Voltage, Current and Charge for passive elements, Dot convention	4	25%
2.	**Basic Network Analysis methods:** Kirchhoff's laws (KVL & KCL), Branch current and mesh currents, Mesh analysis for independent, dependent and sinusoidal sources, Super mesh, Nodal analysis for independent, dependent and sinusoidal sources, Super node, Source transformation techniques, duality concept	8	
3.	**Network Theorems** Superposition, reciprocity, Thevenin's, Norton's, Maximum power Transfer, compensation and Tellegen's theorem for DC and AC circuits.	10	20%
4.	**Initial Conditions** Initial Conditions in elements, Derivative interpretation, Initial condition evaluation	8	
5.	**Transients in First and Second order linear circuits-RL, RC and RLC** First order differential equation and solution, Time constant, Second order homogeneous differential equation and solution, RL and RC sinusoidal transient	6	15%
6.	**Fourier Series and Signal Spectra** Discrete spectra and symmetry of waveform, exponential form of Fourier series, Fourier transform and continuous spectra, and steady state response of a network to non-sinusoidal periodic inputs	6	
7.	**Resonance and Filters** Behaviors of series and parallel resonant circuits Introduction to band pass, low pass, high pass and band reject filters.	6	15%
8.	**Two Port Parameters** Z-parameters, Y-Parameters, h- Parameters, g-Parameters, ABCD Parameters, Inverse T Parameters, Relations between various Parameters.	6	15%
9.	**Network Topology** Introduction, Definitions, Incidence Matrix, Loop or Circuit Matrix, Cut Sets and Cut Set Matrix	6	10%
	Total	60	100%

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INSTRUCTIONAL METHOD AND PEDAGOGY:

- At the start of course, the course delivery pattern , prerequisite of the subject will be discussed

- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weight age should be given to all topics while teaching and conduction of all examinations.

- Attendance is compulsory in lectures and laboratory, which may carries five marks in overall evaluation.

- One/Two internal exams may be conducted and total/average/best of the same may be converted to equivalent of 30 marks as a part of internal theory evaluation.

- Assignment based on course content will be given to the student for each unit/topic and will be evaluated at regular interval. It may carry an importance of ten marks in the overall internal evaluation.

- Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the overall internal evaluation.

LEARNING OUTCOME:

- The student can be acquired the basic knowledge of electric circuits, electrical fundamentals, thus being prepared to pursue any area of engineering spectrum in depth as desired.
- The students will be able to effectively employ electrical systems and lead the exploration of new applications and techniques for their use.

TEXT BOOKS:
- Network Analysis and Synthesis by U.A.Patel11th Edition, Mahajan Publishing House.
- Sudhakar, A., Shyammohan, S. P.; "Circuits and Network"; Tata McGraw-Hill New Delhi, 1994

REFERENCE BOOKS:
- Circuit Theory (Analysis and Synthesis) By A. Chakrabarti, 6th Edition Dhanpat Rai & Company.
- Network Analysis by M.E.Vanvalkenburg, PHI Publication.
- Linear Circuit Analysis by De Carlo/Lin 2nd Edition, Oxford University Press Indian

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LIST OF EXPERMINETS

Sr. No.	Experiment Title
1	To Verify Kirchhoff's Voltage Law (KVL) and Kirchhoff's current Law (KCL).
2	To Verify Superposition theorem for Resistive Network.
3	To Verify Thevenin's Theorem for Resistive Network.
4	To Verify Norton's Theorem for Resistive Network.
5	To Verify Maximum Power Transfer Theorem for Resistive Network.
6	Transient Response of a RL Circuit.
7	Transient Response of a RC Circuit.
8	Determination of Z-Parameters of given Two Port Network.
9	Determination of Y-Parameters of given Two Port Network.
10	Determination of ABCD Parameters of given Two Port Network