# Syllabus

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Subject: **Network Analysis** | | | | | | | | | |
| Program: **B.Tech. in EC Engineering** | | | | Subject Code:EC0318 | | | | Semester: **III** | |
| **Teaching Scheme** | | | | **Examination Evaluation Scheme** | | | | |  |
| **Lecture** | **Tutorial** | **Practical** | **Credits** | **University Theory Examination** | **University Practical Examination** | **Continuous Internal Evaluation (CIE)- Theory** | **Continuous Internal Evaluation (CIE)- Practical** | | **Total** |
| 2 | 1 | - | 3 | 40 | - | 60 | - | | 100 |

**Course Objectives:**

1. Describe, apply and analyze basic network concepts emphasizing series and parallel combination of passive components, source transformation and shifting.
2. Describe, apply and analyze use of mesh and nodal techniques for formulating the transfer function of networks.
3. Apply and analyze various network theorems in solving the problems related to electrical circuits.
4. Describe and analyze two port networks and methods of analyzing the electrical networks.

**UNIT 1**

**Introduction to Basic Concepts & Network Equations: [8 Hours]**

Electromotive force, potential, voltage, current, Resistor, capacitor, inductor, Voltage and current sources, Dependent sources, Dot conventions , current directions, Network Equations, Nodal analysis, Mesh analysis, Source transformation, Analysis of circuit containing dependent sources

**Network Theorems: [8 Hours]**

Superposition theorem, Substitution Theorem, Compensation theorem, Thevenin’s and Norton’s theorem, Maximum power transfer theorem

**UNIT 1I**

**Time domain response of linear circuits [5 Hours]**

Mathematical preliminaries, DC response of first order and second order circuits, Initial conditions in the network, Charging and discharging of capacitor, Charging and discharging of inductor, Solution of circuit equations by using Initial Conditions.

**Transient Network Analysis [7 Hours]**

Initial conditions in inductor and capacitor. Geometrical interpretation of derivatives and procedure for evaluating initial conditions. Response of RL RC and RLC networks using Laplace Transforms for unit step, impulse and ramp inputs.

**UNIT III**

**Laplace transform analysis: Circuit Applications [5 Hours]**

Manipulation of impedance and admittance, Equivalent Laplace transform of circuit elements, RLC circuit analysis using Laplace transform, Switching in RLC circuit, Waveform synthesis, Circuit analysis in Laplace transform

**UNIT IV [7 Hours]**

**Two Port Network**

Y- Parameter, Z-Parameter, h-parameter, ABCD- parameter, Relation between two port parameters, Parallel connection of two network

# Course Outcomes (CO’s)

After completion of this course, students will be able to,

1. Understand and solve the circuits using node and mesh analysis [BT 2].
2. Apply concept of different network theorems and use the optimum method to solve the circuit [BT 3].
3. Understand the working of capacitor and inductor and how to apply initial conditions [BT 2].
4. Apply Laplace transform to solve the circuits [BT 3].
5. Understand two port parameters and how to find out different types of them [BT 2].
6. Apply concept of source transformation and reduce the complex circuit [BT 3].

**TEXT BOOKS:**

1. M.E. Van Valkenberg, “Network Analysis”, Prentice Hall of India, 3rd edition, 2000, ISBN: 9780136110958.
2. K Channa Venkatesh, D. Ganesh Rao, Network Analysis, Cenage Learning
3. Roy Choudhury, “Networks and Systems”, 2nd edition, 2006, New Age International Publications, ISBN: 9788122427677.

**REFERENCE BOOKS:**

1. Hayt, Kemmerly and Durbin “Engineering Circuit Analysis”, TMH 7th edition, 2010.
2. U A Patel, “Network Analysis And Synthesis”, Mahajan Publication House
3. J. David Irwin and R. Mark Nelms, “Basic Engineering Circuit Analysis”, John Wiley, 8th edition, 2006.
4. Charles K Alexander and Mathew N O Sadiku, “ Fundamentals of Electric Circuits”, Tata McGraw-Hill, 3rd edition, 2009.