|  |  |  |  |
| --- | --- | --- | --- |
| **Course Name:** | **Networks, Signals and Systems** | **Semester:** | **III** |
| **Date of Performance:** | **31 / 07 / 23** | **Batch No:** | **A-3** |
| **Faculty Name:** | **Bhargavi Kaslikar** | **Roll No:** | **16014022050** |
| **Faculty Sign & Date:** |  | **Grade/Marks:** |  |

**Experiment No: 1**

**Title: Tutorial on Network Elements and Sources**

|  |
| --- |
| **Aim and Objective of the Experiment:** |
| Network Elements and Sources (Mesh and Nodal). |

|  |
| --- |
| **COs to be achieved:** |
| **CO1:** Analyze DC and AC circuits using mesh, nodal analysis, and network theorems. |

|  |
| --- |
| **Theory:** |
|  |

|  |
| --- |
| **Stepwise-Procedure:** |
| In this experiment, we used LTspice, a popular electronic circuit simulation software, to analyze two circuits using different techniques: mesh analysis and nodal analysis. The objective was to understand how to simulate and analyze circuits using LTspice and compare the results obtained from both analysis methods.  **Steps for Circuit Setup on Ltspice;**   1. Open LTspice:    * Launch the LTspice software on your computer. 2. Draw Circuit and Add Components:    * Utilize the appropriate library components for resistors, capacitors, voltage sources, and current sources. You can access these components via the toolbar or the 'F2' shortcut key.    * Properly interconnect the components to form the desired circuit configuration. 3. Set Current Source:    * Add a current source (dependent or independent) to your circuit. This source can serve as a reference for your analysis. 4. Set Source Type:    * Double-click on the voltage or current source you added to the circuit.    * Adjust the source parameters as necessary, such as voltage or current values. 5. Add Ammeter to Measure Reference Current:    * Access the component library and search for "Ammeter."    * Insert the ammeter into the circuit at the desired location to measure the reference current.    * Connect the ammeter in series with the current source you added earlier. 6. Analysis and Results:    * Analyze the simulation results to determine voltages and currents across various components in the circuit.    * Compare the results obtained from nodal analysis and mesh analysis. Note any discrepancies or similarities. |

|  |
| --- |
| **Observations:** |
| 1. **Circuit 1 (using mesh analysis):**        1. **Circuit 2 (using nodal analysis):** |

|  |
| --- |
| **Post Lab Subjective/Objective type Questions:** |
| **Solve the below question using Nodal and Mesh Analysis:** |

|  |
| --- |
| **Conclusion:** |
| We have successfully learned about network elements and sources in electrical circuits through mesh and nodal analysis. Understanding how to analyze and model these elements using mesh and nodal techniques on Ltspice has allowed us to comprehend complex circuits and accurately calculate currents and voltages |

|  |
| --- |
| **Signature of faculty in-charge with Date:** |