# 20ES1351-BASIC SIMULATION LAB

| Course Code | 20ES1351 | Year | II | Semester | I |
|---|---|---|---|---|---|
| Course Category | Engineering Sciences | Branch | ECE | Course Type | Lab |
| Credits | 1.5 | L-T-P | 0-0-3 | Prerequisites | Nil |
| Continuous Internal Evaluation: | 15 | Semester End Evaluation: | 35 | Total Marks: | 50 |

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| Course Outcomes | |
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| Upon successful completion of the course, the student will be able to | |
| **CO1** | Analyse various types of signals and sequences. |
| **CO2** | Apply convolution and correlation operations on different signals |
| **CO3** | Analyse various circuits in the time and transform domains using transient analysis methods |
| **CO4** | Analyse various networks by applying transformation techniques, mesh analysis, nodal analysis and network theorems |
| **CO5** | Determine the characteristics of different two port networks |

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**Mapping of course outcomes with Program outcomes (CO/ PO/PSO Matrix)**

Note: 1- Weak correlation 2-Medium correlation 3-Strong correlation

* - Average value indicates course correlation strength with mapped PO

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 2 | 2 | 2 | 2 | 3 | 1 | | | | 2 | | | 2 | |
| CO2 | 3 | 3 | 2 | 2 | 3 | 2 | | | | 2 | | | 3 | |
| CO3 | 3 | 2 | 3 | 3 | 3 | 1 | | | | 2 | | | 2 | |
| CO4 | 3 | 3 | 2 | 3 | 3 | 2 | | | | 3 | | | 3 | |
| CO5 | 3 | 2 | 2 | 2 | 3 | 1 | | | | 2 | | | 3 | |
| Average* (Rounded to nearest integer) | 3 | 2 | 2 | 2 | 3 | 1 | | | | 2 | | | 3 | |

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| Syllabus | | |
|---|---|---|
| **Expt. No.** | **Contents** | **Mapped CO** |
| I | Generation of Various Signals and Sequences such as Unit impulse, Unit step, Square, Triangular, Sinusoidal, Ramp and Sync functions. | **CO1** |
| II | Operations on Signals and Sequences such as Addition, Multiplication, Scaling, Shifting and Folding. | **CO1** |
| III | Verification of Linearity and Time Invariance properties of a given Continuous / Discrete-time system. | **CO1** |
| IV | Convolution of Signals and Sequences. | **CO2** |

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|---|---|---|
| V | Computation of Unit Sample and Unit Step Response of given LTI System | **CO1** |
| VI | Find the Fourier Transform of a given signal and plot its magnitude and phase spectrum. | **CO1** |
| VII | Auto Correlation and Cross Correlation of Signals and Sequences | **CO2** |
| VIII | Experimental determination of time constant of series RL & RC circuits | **CO3** |
| IX | Experimental determination of frequency response of RLC circuits | **CO3** |
| X | Experimental verification of Thevenin's and Norton's theorems | **CO4** |
| XI | Experimental verification of Superposition Theorem& Maximum power transfer Theorem | **CO4** |
| XII | Simulation of a given series resonance circuit | **CO4** |
| XIII | Determination of parameters for a given two port network | **CO5** |

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**Learning Resources**

**Text Books**

1. Alan V. Oppenheim, Alan S. Wilsky with S.Hamid Nawab, 'Signals and Systems', 2/e, Pearson Education, 1997
2. M. E.Van Valkenburg, Network Analysis, III Edition , Pearson Education
3. A. Sudhakar and Shyammohan S. Palli, Circuits and Networks, 5th Edition, McGraw Hill

**Reference Books**

1. Simon Haykin, Barry Van Veen, 'Signals and Systems', 2/e, Wiley Student Edition.
2. Bhagawandas P. Lathi, 'Linear Signals and Systems', Oxford University Press, 2009.
3. Signals and Systems using MATLAB, Kindle Edition, Luis Chaparro
4. William H. Hayt, Jack E. Kimmerly and Steven M. Durbin, Engineering Circuit Analysis, 8th Edition, TataMcGraw Hill
5. Ravish R. Singh , Network Analysis and Synthesis, First Edition, Tata McGraw Hill Education (India) Pvt. Ltd, New Delhi

**e- Resources & other digital material**

1. http://www.cdeep.iitb.ac.in/nptel/Electrical%20&%20Comm%20Engg/Signals%20and%20System/TOC-M1.htm
2. http://www.cdeep.iitb.ac.in/nptel/Electrical%20&%20Comm%20Engg/Signals%20and%20System/Course%20Objective.htm.
3. http://www.stanford.edu/~boyd.ee102
4. http://www.ece.gatech.edu/users/bonnie/book
5. http://ocw.mit.edu
6. https://www.youtube.com/playlist?list=PLC7D3EAEFA0CC0420&app=desktop
7. https://www.tutorialspoint.com/network_theory/network_theory_quick_guide.htm
8. https://nptel.ac.in/courses/108/105/108105159/

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