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| **Course Type** | **Course Code** | **Name of Course** | **L** | **T** | **P** | **Credit** |
| DC | ECC202 | Signals & Networks | 3 | 1 | 0 | 11 |

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| **Course Objective** |
| The objective of the course is to develop an understanding of the basic signals and network concepts. Signal concepts will be needed in a broad range of areas including Communication Theory, Signal Processing and Image Processing. Network concepts will be needed in case Analog Circuit Design. |
| **Learning Outcomes** |
| Upon successful completion of this course, students will:   * acquire a basic knowledge of the properties of signals. * develop the understanding of the analysis of circuits |

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| **Unit No.** | **Topics to be Covered** | **Lecture Hours** | **Learning Outcome** |
| 1 | Definitions and concepts of different types of signals and systems, Convolution, Differential and Difference equation, LTI systems. | 12 | Acquire an understanding of methods of the analysis of signals & systems |
| 2 | Fourier Series, Fourier Transforms, Laplace Transform. | 08 | Understand the concept of transformation. |
| 3 | Time domain analysis of RL, RC, and RLC circuits, Transient solutions of networks using Laplace Transform; | 04 | Develop an understanding about the time domain analysis of passive networks |
| 4 | Network functions: poles, zeros, transfer function, two port network parameters and functions : Z, Y and ABCD parameters, driving point and transfer impedances and admittances; | 06 | Develop the concepts of analyzing the circuits using two port network parameters |
| 5 | Network Theorems and Formulation of Network equations: generalized formulation of KCL, KVL, Thevenin, Norton, Maximum Power Transfer, Tellegen and Reciprocity Theorems; | 06 | Understand the applications of different network theorem to analyze circuits. |
| 6 | Graph theory: Tree, Co-tree, fundamental cut-set, fundamental loop analysis of network | 04 | Understand the fundamentals and applications of graph theory |

**Textbook:**

1. Signals and Systems by Alan V. Oppenheim, Alan S. Willsky with S. Hamid Nawab, Pearson Education India; 2 edition (2015)

2. Network Analysis by M. E. Van Valkenburg, Prentice-Hall of India Pvt Ltd., New Delhi,Third Edition.

**Reference Books:**

1. Principles of Signal Processing and Linear Systems by B.P. Lathi,Oxford University Press; First edition (July 2009).

2. Schaum's Outline of Graph Theory: Including Hundreds of Solved Problems (Schaum's Outlines) by V. Balakrishnan, McGraw-Hill Education; First edition

**(Devendra Chack)**