# Analog & Digital IC Applications

| **Course Code** | 23EC3501 | **Year** | III | **Semester** | I |
|---|---|---|---|---|---|
| **Course Category** | PC | **Branch** | ECE | **Course Type** | Theory |
| **Credits** | 3 | **L-T-P** | 3-0-0 | **Pre requisites** | EDC, STLD |
| **Continuous Internal Evaluation** | 30 | **Semester End Evaluation** | 70 | **Total Marks** | 100 |

| **Course Outcomes** | | |
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| Upon successful completion of the course, the student will be able to | | BL |
| **CO1** | **Understand** the fundamentals of different ICs, data converters and memories. | L2 |
| **CO2** | **Apply** the concepts of IC 555 to solve problems related to timer circuits. | L3 |
| **CO3** | **Compare** different data conversion techniques. | L3 |
| **CO4** | **Apply** the knowledge of various digital ICs to solve digital design problems. | L3 |
| **CO5** | **Analyze** various applications of op-amp. | L4 |

| **Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of Correlations ( 3:High, 2:Medium, 1:Low )** | | | | | | | | | | | | | |
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| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO 10** | **PO 11** | **PSO 1** | **PSO 2** |
| **CO1** | 2 | | | | 1 | | | | | | 1 | 2 | |
| **CO2** | 3 | | | | 1 | | | | | | 1 | 2 | |
| **CO3** | 3 | | | | 1 | | | | | | 1 | 2 | |
| **CO4** | 2 | | | | 1 | | | | | | 1 | 2 | |
| **CO5** | 3 | 3 | | | 1 | | | | | | 1 | 2 | |
| Avg. | 3 | 2 | | | 1 | | | | | | 1 | 2 | |

| **Syllabus** | | |
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| **Unit No.** | **Contents** | **Mapped CO** |
| 1 | **Operational Amplifier:** Ideal and Practical Op-Amp, Op-Amp Characteristics: DC and AC Characteristics, Features of 741 Op-Amp, Modes of Operation: Inverting, Non-Inverting, Differential Modes. Instrumentation Amplifier, Differentiators and Integrators, Comparators, Schmitt Trigger. | CO1, CO5 |
| **2** | **Applications of op-amp and IC 555 Timer:** Introduction to Active Filters, Characteristics of Active Filters, Waveform Generators – Triangular and Square Wave Generators, IC555 Timer-Functional Diagram, Monostable and Astable Operations and their design. | CO1, CO2, CO5 |
| **3** | **Data Converters:** Introduction, different types of DACs-Weighted resistor DAC, R-2R ladder DAC, Different Types of ADCs – Parallel comparator type ADC, Counter Type ADC, Successive Approximation ADC and Dual slope ADC, DAC and ADC Specifications. | CO1,CO3, |
| **4** | **Combinational Logic ICs:** Integrated Circuits related to decoders, | |

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| | encoders, multiplexers, de-multiplexers, Code Converters, Comparators, Adders. | CO1,CO4, |
| **5** | **Sequential Logic ICs:** Integrated Circuits related to Latches, flip-flops, counters and shift registers.<br>**Memories** - ROM Architecture, Types of ROMS, RAM Architecture, Static & Dynamic RAMs. | CO1,CO4 |

| **Learning Resources** |
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| **Text Books** |
| 1. Ramakanth A. Gayakwad, Op-Amps & Linear ICs, 4th Ed., PHI, 2010.<br>2. Floyd and Jain, Digital Fundamentals, 8th Ed., Pearson, 2005. |
| **Reference Books** |
| 1.D. Roy Choudhury, Linear Integrated Circuits, New Age International, 2nd Ed., 2003.<br>2.John. F. Wakerly, Digital Design Principles and Practices, 3rd Ed., Pearson, 2009. |
| **e-Resources & other Digital Material** |
| 1. https://www.youtube.com/watch?v=lpXNCwsnxjM&list=PLuv3GM6-gsE3npYPJJDnEF3pdiHZT6Kj3<br>2. https://www.youtube.com/watch?v=g6CCJAbdkK8&list=PLHO2NKv71TvsSqYwVvUCZwNkY-jUyUHdS |