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| ***Name of The Course*** | Introduction to Digital Systems | | | | |
| ***Course Code*** | BEE01T1005 | | | | |
| ***Prerequisite*** |  | | | | |
| ***Corequisite*** |  | | | | |
| ***Antirequisite*** |  | | | | |
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***Course Objectives:***

1. *To familiarize with various Digital IC*
2. *To understand basic fundamentals of Digital circuits..*
3. *To prepare for various engineering applications*.

***Course Outcomes:***

After successful completion of the course, students will be able to:

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| --- | --- |
| CO1 | Solve the problems on Number system codes and their conversions. |
| CO2 | Identify Digital IC and implement in the circuits. |
| CO3 | Create, design and simulate canonical logic forms |
| CO4 | Demonstrate the application of combinational and sequential logic circuits |

***Text Book (s)***

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| --- | --- | --- | --- | --- | --- |
| **Sr. No.** | **Title** | **Author Name** | **Publisher** | **Year of Publication** | **Edition** |
| 1 | Digital Electronics | R P Jain | McGraw Hill | 2017 | Second |
| 2 | Digital Logic and Computer Design | Morris Mano | PHI | 2017 review | Second |
| 3 | Digital Electronic Principles- | Malvino | PHI | 2011-13 | Seventh |

***Course Content:***

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| **Unit-I: Number Systems & Boolean Algebra** |
| Decimal, binary, octal, hexadecimal number system and conversion, binary weighted & non-weighted codes & code conversion, signed numbers, 1s and 2s complement codes, Binary arithmetic, Binary logic functions , Boolean laws, truth tables, associative and distributive properties, De-Morgan’s theorems, realization of switching functions using logic gates. Logic families: TTL, ECL, CMOS. |
| **Unit-II: Combinational Logic:** |
| Switching equations(Mathematical operations), canonical logic forms, sum of product & product of sums, Karnaugh maps, two, three and four variable Karnaugh maps, simplification of expressions, mixed logic combinational circuits, multiple output functions, QuineMcluskey Methods for 5 variables.  Introduction to combinational circuits, code conversions, decoder, encoder, priority encoder, multiplexers & De-multiplexer, binary adder, Subtractor, BCD adder, carry look ahead adder, Binary comparator, Arithmetic Logic Units. |
| **Unit-III: Sequential Logic & Circuits:** |
| Latch, flip-flops, clocked and edge triggered flip-flops, timing specifications, asynchronous and synchronous counters counter design, Registers, types of registers. Analysis of simple synchronous sequential circuits |
| **List of Experiment**   * To study the basic logic gates * Verify their truth table. * Verification of De Morgan’s Theorem. * Verification Of SOP & POS Given Algebraic Expression Using Universal Gates. * Designing of HALF and Full adder using basic logic gates. * Design of 4:1 MULTIPLEXER USING GATES. * Design and Implementation of 1-bit Magnitude Comparator using basic logic gates. * Design and Verification of S-R Flip-Flop Circuits. * Realization of 3-bit synchronous counter design For Various Application. * Frequency counters * Digital clock * Time measurement * Project based learning: Building of LED Series / Seven Segment LED / Display unit. |

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| CO’s | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | S | W | M |  | W |  | W |  |  |  |  |  |
| CO2 | M | S |  | W | M |  |  |  |  |  |  | W |
| CO3 |  |  | W | M |  | M |  |  | W |  |  |  |
| CO4 |  | M |  |  |  | M |  |  |  | W | W |  |

Solve the problems on Number system codes and their conversions.

Identify Digital IC and implement in the circuits.

Create, design and simulate canonical logic forms

Demonstrate the application of combinational and sequential logic circuits