# PVP SIDDHARTHA INSTITUTE OF TEHNOLOGY, KANURU, VIJAYAWADA
## (AUTONOMOUS)
## INFORMATION TECHNOLOGY
### Fundamentals of Digital Logic Design
### (Common to CSE & IT)

| Course Code | 20IT3301 | Year | II | Semester | I |
|---|---|---|---|---|---|
| Course Category | PC | Branch | IT | Course Type | Theory |
| Credits | 3 | L-T-P | 3-0-0 | Prerequisites | Basic Electrical &Electronics Engg. |
| Continuous Internal Evaluation | 30 | Semester End Evaluation | 70 | Total Marks | 100 |

| Course Outcomes | | |
|---|---|---|
| Upon successful completion of the course, the student will be able to | | |
| CO1 | Understand the basic concepts of digital circuits. | L2 |
| CO2 | Apply minimization techniques to simplify Boolean expressions. | L3 |
| CO3 | Apply the principles of digital electronics to design combinational and sequential circuits. | L3 |
| CO4 | Analyze the functionality of combinational circuits and sequential circuits. | L4 |

**Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO 6 | PO 7 | PO 8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | 3 | | | | | | | | | | | | | |
| CO2 | 3 | | | | | | | | 3 | 3 | | | 3 | |
| CO3 | 3 | | | | | | | | 3 | 3 | | | 3 | |
| CO4 | | 3 | | | | | | | 3 | 3 | | | 3 | |

| Syllabus | | |
|---|---|---|
| **Unit No** | **Contents** | **Mapped CO** |
| I | **Digital Systems and Binary Numbers:** Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Complements of Numbers, Signed Binary Numbers, Binary codes and Binary Logic. | CO1 |
| II | **Boolean Algebra and Logic Gates:** Introduction, Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean Algebra, Boolean functions, Canonical and Standard Forms. <br><br>**Gate–Level Minimization :** Introduction, Map Method-Two variable, Three variable K-map's, Four Variable K-Map, Product of Sums Simplification, Don't Care Conditions,NAND and NOR implementation. | CO1,CO2 |
| III | **Combinational Logic:** Introduction, Combinational Circuit, Analysis Procedure, Design Procedure, Binary adder- sub tractor, Decimal Adder, BCD to Seven Segment Display, Encoders, Decoder, Multiplexers, Demultiplexers. | CO1, CO3,CO4 |
| IV | **Sequential Logic:** Introduction, Storage Elements: Latches –SR, D Latches Storage Elements: Flip Flops–SR, JK, D and T Flip Flops, Characteristic tables, Characteristic equation, Excitation tables. | CO1, CO3, CO4 |
| V | **Registers and Counters:** Registers, Shift Registers- Serial Transfer, Serial Addition, Universal Shift Register, Ripple Counters-Binary Ripple Counter, BCD Ripple Counter, Synchronous Counters-Binary Counter, Up–Down Binary Counter, BCD Counter, Binary Counter with Parallel Load Other Counters- Ring counter, Johnson counter. | CO1, CO3, CO4 |

## Learning Resources

**Text Books**

1. *Digital Design*, M. Morris Mano, Michael D.Ciletti, Fifth Edition, 2013, Pearson.

**References**

1. *Switching Theory and Finite Automata*, Zvi. Kohavi, Niraj K. Jha, Third Edition, 2010, Cambridge, University Press.
2. *Fundamentals of Digital circuits*, A. Anand Kumar, Third Edition, 2013, PHI.

**e-Resources & other digital material**

1. https://nptel.ac.in/courses/106/108/106108099/http://nptel.ac.in/courses/117106086/1
2. https://nptel.ac.in/courses/117/105/117105080/
3. https://www.udemy.com/course/digital-electronics-logic-design/
4. https://learnabout-electronics.org/Digital/dig20.php
5. https://www.tutorialspoint.com/digital_circuits/digital_circuits_logic_gates.htm
6. https://www.geeksforgeeks.org/digital-electronics-logic-design-tutorials/