

SHRI R. K. PARIKH ARTS AND SCIENCE COLLEGE, PETLAD.

ADD-ON CERTIFICATE COURSE FOR SCIENCE

Course Title : Complete Boolean Algebra & Logic Gates

Coordinator : Dr. S. D. Shukla

Department : Mathematics

Duration : 20 Hours [Theory], 10 Hours [Practical]

COURSE CONTENT:

1. Number System : Decimal, Binary and Hexadecimal
2. Conversation form decimal to binary and hexadecimal
3. Conversion from binary to decimal and hexadecimal
4. Conversion from hexadecimal to binary and decimal
5. Arithmetic operation of binary numbers : Binary addition, Binary subtraction
6. 1's and 2's compliments of binary numbers.
7. Excess-3 code, gray code
8. Boolean Algebra introduction
9. Boolean logic operations, laws of Boolean Algebra
10. The DeMorgan's Theorem.
11. Simplification of Boolean Expressions using Boolean Laws.
12. Logic circuits, logic level and logic system.
13. AND Gate, OR Gate, NOT Gate
14. NAND gate, NOR gate,
15. Logic gate simplification
16. Karnaugh map and truth table
17. Simplification of Karnaugh map (Pair, quad, octet, overlapping, rolling)
18. Sum of Products (SOP) and product of sum (POS)

PRACTICALS:

1. AND gate
2. OR gate
3. NOT gate
4. NAND gate
5. NOR gate
6. Mathematical operations using Boolean algebra

OUTCOMES OF COURSE:

- BASIC understanding of Boolean algebra.
- Develop fundamental knowledge of logic gates and its circuits.
- Understand Karnaugh maps and operations.
- Understand the use of Boolean algebra in logic circuits for various applications.

References:

1. Digital Principles and Applications by A. P. Malvino & D. P. Leach, Tata McGraw-Hill Publishing Co. Ltd. (ISBN-0-07-462231-8)
2. Digital Electronics: Principles, Devices and Applications by Anil K. Maini, John Wiley & Sons, Ltd. (ISBN: 978-0-470-03214-5)
1. Digital Logic Design by R. P. Ajwalia, Atul Prakashan

Web Resources:

1. <https://nptel.ac.in/courses/106/105/106105185/>
2. <https://nptel.ac.in/courses/106/108/106108099/>